COAL AGE

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ARBITRARY RULING

Most of us work for the other fellow. Whether we like it or not, we find ourselves "bossed." For the great majority of people there is no broad avenue of escape. Sometimes one stronger than the rest kicks out of the traces, starts in for himself and makes good; but in the main those who try to pull this stunt come back for more bossing.

Perhaps the most sensible people are those who take their medicine gracefully and recognize that the only way to keep from being bossed is to grow big enough to be a boss. It is during this process of personal elevation that the peculiarities and attributes of bosses may be studied to advantage.

We recently talked with a man who had worked for 20 years under bosses of all kinds. Some of his views may be prejudiced, but one point he drove home deals with a trait possessed by too many executives—that of arbitrariness. If coal-mine officials knew in full the evil effects of arbitrary rulings, most of them would decide to dispense with this unworthy attribute of their profession.

A young engineer took to his superior a plan for establishing a central pumping station in one of the company's mines. He pointed out that by cutting some ditches the water from three adjoining collieries would drain to this central point and several expensive pumping installations previously maintained could be abandoned. He showed clearly the saving that would result, to say nothing of the losses that would be curtailed by eliminating temporary shutdowns due to high water.

His superior put his authority into play and refused to consider the plan. In other words, he made an "arbitrary ruling." However, a year later the management of the concern got wise to the natural conditions prevailing at these mines and worked out a scheme similar in every detail to the plan first proposed by the young engineer.

Another case was that of a clever and experienced employee in the operating end of a coal company that had but one competitor in the field where its mine was located. The man referred to devoted all his spare time for several months to perfecting a scheme for electrifying his company's mines. He presented his plan to the mine superintendent, showing clearly the reduction in costs that would be accomplished. It so happened that the superintendent didn't like the man and arbitrarily condemned his plan, with the result that this particular employee accepted the first opportunity to obtain a position with the competing concern. The management of the latter company had wise heads in charge, for they electrified their operations with signal success.

Mining men who read this will remember many similar occurrences. Some will be able to call to mind executives with whom arbitrary ruling was such a habit that their subordinates became discouraged and ceased to offer suggestions.

Every boss should be willing to profit by the experience of others. It is pitiful to watch the gropings of those mine officers who have lost the confidence and sympathy of their men. A mine management that does not draw employees toward it is a luxury too expensive to tolerate in this day of keen competition.

Electrical Distribution and Application in Mines--I

By H. M. Warren*

SYNOPSIS—The application and distribution of electric energy in mines in the anthracite region is here described. Both direct and alternating current is used, each having its advantages for certain applications.

The intention of the writer is to describe in a general way the distribution and application of electricity in anthracite mines. The subject is so broad that to attempt detailed descriptions in all cases would be hardly practicable and probably uninteresting in many respects. For this reason a general description with only such detail as may be thought interesting will be attempted.

While the title confines the subject to equipment underground, the liberty of saying a few words about the method of supporting cables on the surface will be taken.

In the past, direct current was used almost exclusively, either at a voltage of about 250 or 500. In recent years, however, by reason of the more general application of electricity, there is a decided tendency to generate alternating current, transmit it at a reasonably high voltage and then convert or transform it to low-voltage alternating or direct current at or near the point of application.

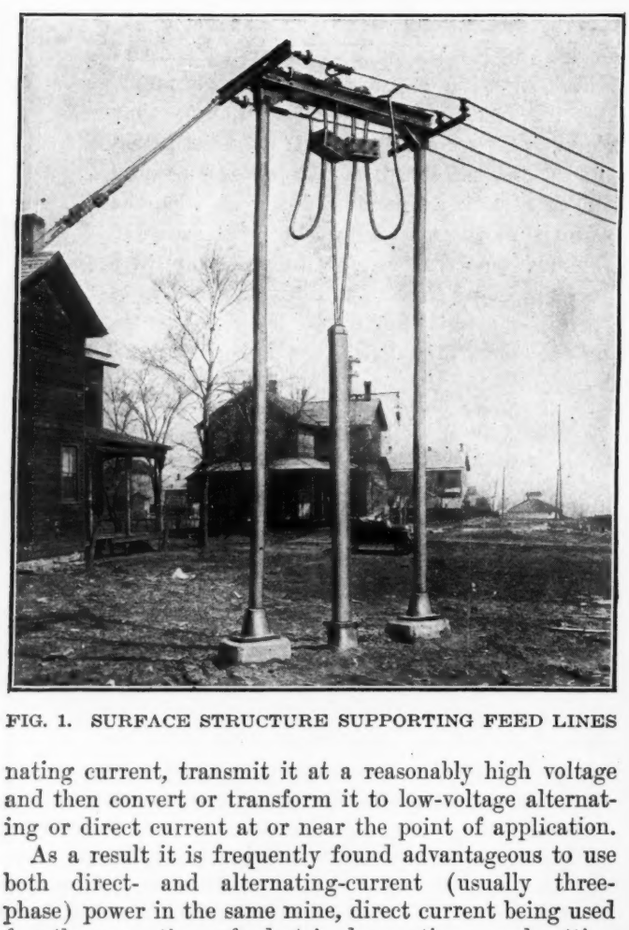

FIG. 1. SURFACE STRUCTURE SUPPORTING FEED LINES

As a result it is frequently found advantageous to use both direct- and alternating-current (usually three-phase) power in the same mine, direct current being used for the operation of electric locomotives, coal-cutting machines, portable track pumps, portable air compressors or any other equipment that may be operated from a direct-current trolley line or feeder. The alternating current is frequently used to advantage in the operation of equipment requiring medium or large amounts of power, such as pumps and hoists, although it can also be employed to advantage in certain cases in the operation of coal-cutting machines.

In general, however, because of the use of the electric mining locomotives, with resultant trolley lines extending to many portions of the mines, the direct current is used except in equipments requiring considerable power, in which case low-voltage (250) direct current would not work out to so good advantage because of the high cost of copper involved in the transmission of energy for any considerable distance.

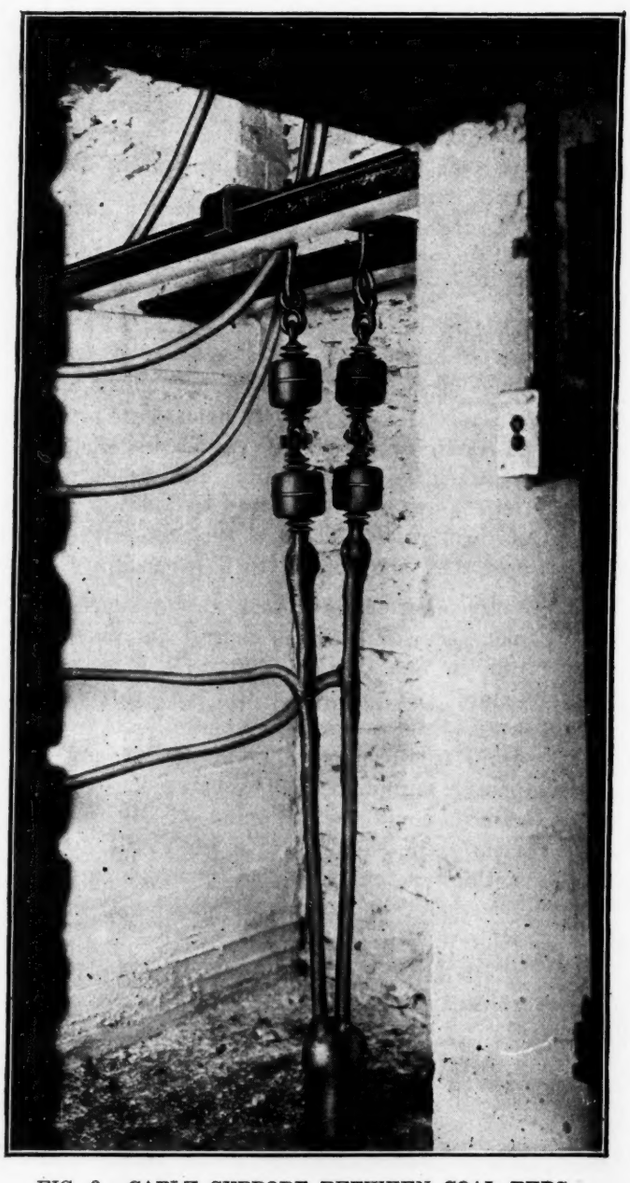

FIG. 2. CABLE SUPPORT BETWEEN COAL BEDS

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The active workings of anthracite mines ordinarily extend over a large area, and for this reason it is frequently advisable to run transmission lines on the surface and feed the equipment inside by cables suspended in boreholes. There are four ways of taking the feeders into the mines—through a drift, down a slope, a shaft or a borehole.

Where it is at all practicable, a borehole properly lined is most desirable, for the cables are then free from mechanical injury and not liable to be subjected to the action of bad water. In shafts where there is sufficient space to suspend the cable so that it is entirely free from contact with any portion of the shaft, piping or other material and not likely to be damaged by falling ice or coal, there is no serious objection to suspending it in the shaft. But even in cases of this sort where the shaft is clear, there remains the possibility of damage by workmen or a wreck in the shaft. However, these instances are few, as the space in most shafts is taken up by steam, air or water lines.

There is no reason why cables should not be taken in through a drift or down a slope if conditions are favorable to this method, but as compared to a borehole, they are still subject to greater liability of damage.

Fig. 1 shows a structure on the surface supporting the feed lines where they are "dead-ended" and from which the borehole cables are suspended. This installation is for a direct-current circuit, but a similar type of structure is used for alternating-current circuits. Whenever a borehole is used in connection with an alternating-current circuit and the distance from the top of the borehole to the place where the power is to be used and the amount of power required is not too great, it is advisable to place the transformer at the top of the borehole and reduce the voltage from the transmission circuit at that point rather than to place the transformers inside. This arrangement permits taking the lower voltage into the mine, the transformer can be easily inspected, the coils (which require considerable headroom for their removal) can be removed for repair, and the cost of providing space for the transformer inside is eliminated.

When using alternating current for the operation of equipment requiring a large amount of power, there is no reason why a high voltage should not be taken inside through a borehole, the voltage reduced inside by transformers or supplied directly to the motor at the transmission voltage, if the motor is properly designed and the entire equipment installed in a correct manner.

However, because of the dampness and conditions that usually exist, it is not advisable to use a voltage exceeding 4,000 for the direct operation of an induction motor, and it might be better practice to limit this to 2,300. This is entirely a question of the insulation of the induction-motor coils and general conditions where the motor is used.

In my opinion transformers used inside should have a case made of reasonably heavy material of such construction as to withstand a red heat without coming apart. The top should be provided with a cover which would open automatically to relieve any excessive pressure in the transformer and permit of the introduction of a fire extinguisher in case of necessity.

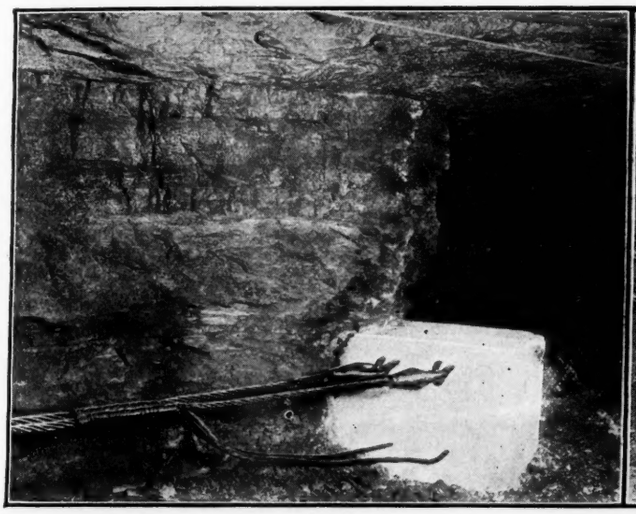


FIG. 3. CABLE ANCHORAGE AND BOND ATTACHMENT

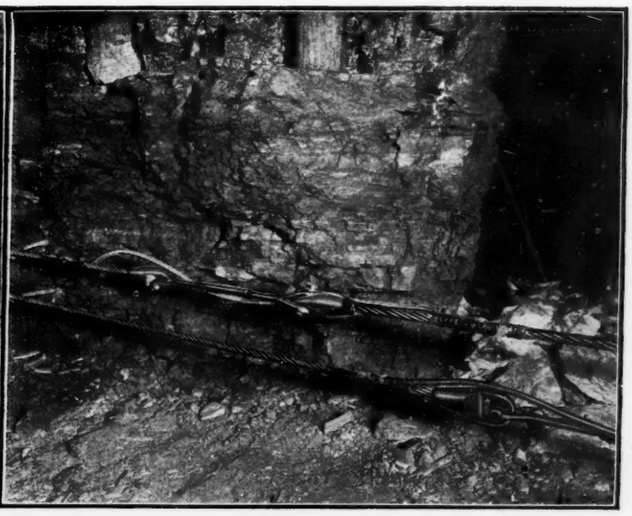


FIG. 4. TIGHTENING A CABLE WITH A TURNBUCKLE

Fig. 2 shows the arrangement of supporting cables where they are dropped from one coal bed to another. The cables from the surface coming down to this point through a borehole are taken to a distributing switchboard, from which point feeders are run off in this particular vein and one feeder is carried on down to the vein below.

The use of 250 or 300 volts direct current for mining locomotives, while decreasing the danger from a shock due to contact, increases the amount of copper required over that which would be necessary with a higher voltage. In an endeavor to keep down the cost of copper, second-hand steel cables are used for reinforcing the grounded return circuit. As these are usually old hoisting cables an inch and a quarter in diameter or larger, they are quite heavy to handle and require special means of support to keep them in good condition, as, from past experience, it is found unsatisfactory to lay them along the roadway or support them in the manner of supporting the ordinary feeder—that is, by means of pins and insulators. As the price of copper is now very high, the views showing certain methods of support of the steel cable will undoubtedly be of interest.

Fig. 3 shows the method of anchoring two cables, also the way of taking off copper bonds at a point near the end of the cable.

Fig. 4 shows the process of pulling up the cable by means of a turnbuckle, with the copper bond around the connection. In making the bond connection, the old steel cable is first cleaned, then thoroughly tinned. The copper bond wire is then wrapped around the cable and thoroughly soldered, after which the joint is taped and the entire cable painted.

Fig. 5 shows the manner of supporting steel cables and feeders on the opposite side of the circuit when running through a manway.

Where the roof is low or the cables heavy, or both, the method of construction shown in Fig. 6 works out to good advantage, making a good, neat and permanent job, with wires close to the roof.

No. 4/0, B. & S. copper wire is most frequently used as a feeder for reinforcing the trolley or the positive side of the direct-current circuit, and is ordinarily supported

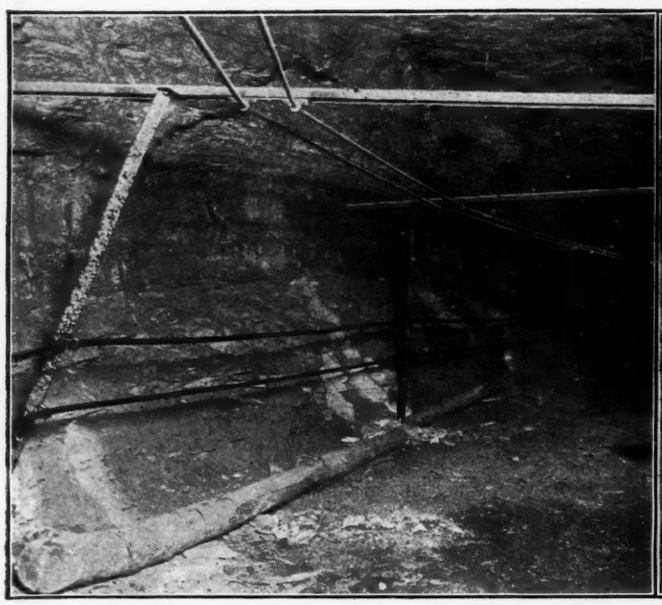


FIG. 5. METHOD OF SUPPORTING STEEL CABLES AND FEEDERS IN A MANWAY

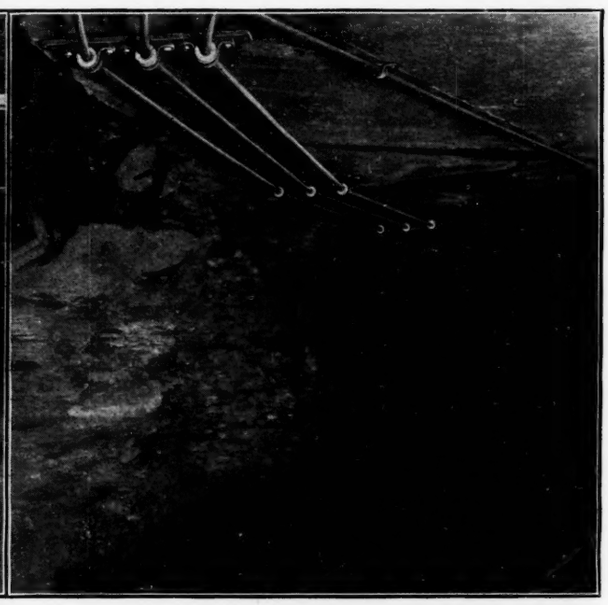


FIG. 6. CABLES AND FEEDERS SUPPORTED CLOSE TO THE ROOF

on insulators attached to the rib, roof or timbers. Sectionalizing switches should be used in the feeder circuits and trolley lines at such points as may be necessary to permit cutting the power off the various circuits when not in use or in the event of accident.

Fig. 7 is a view of a distributing board at a point where feeder circuits are brought in from each of two substations, permitting the load in this section to be handled from either substation as desired. Steel cables on the grounded return circuit can also be seen in this view, as well as the method of insulating the positive cables at the dead-ending frame by means of heavy porcelain insulators.

The low-voltage alternating-current feeders can be installed in a manner similar to those carrying direct current, but care must be taken in the calculations of these circuits to consider the effect of induction and what is known as "skin effect," when large amounts of current are considered. It may be found advantageous to split the circuit up using more wires of a smaller size, rather than to use a smaller number of large size. A good secondary potential to use is 440 volts, but even with this the current required for the operation of hoists or pumps using 200 or 300 hp. is such as to cause consideration of these factors when it is necessary to carry the circuits for any considerable distance.

When the apparatus to be driven is at a considerable distance below the surface, say 1,000 or 1,500 ft., the cost of a borehole becomes an important item, and under these conditions it would probably be advisable to carry the high-tension circuit down through the bore hole, then through a conduit system installed under the roadway or at some convenient location, to the point of application to the step-down transformer or transformers. If the high-tension cable was armored, it might be supported along the rib or roof, but unless conditions were favorable, it would be subject to damage by the changing of timbers, falling of roof and from wrecks. The first cost of underground duct is high, but if it can be used for a long period, the expense is undoubtedly justified. No general rule can be given, but each case must be carefully considered.

The size of wire for a trolley line depends on the voltage, the amount of power required and the length of the circuit, but for 300-volt service it is customary to use a relatively large wire, one of about 3/0 B. & S. gage. Even with the use of a large-sized wire, the drop in voltage permitted is high, with a maximum permissible drop of about 120 volts, when the direct-current potential generated is 300. This gives a minimum trolley voltage at the locomotive of 180. This percentage drop in voltage would be considered excessive and not allowable except in mining or some similar service, but it is good engineering under anthracite-mining conditions when there are various branch trolley lines extending for considerable distances and over which the locomotive operates at infrequent intervals.

Such roads are used for limited periods, and when this section becomes worked out, the wire is taken down and used elsewhere. This condition, together with the low cost of power, would not warrant the investment in copper and labor necessary to provide circuits of such capacity as to give a small drop in voltage. Experience

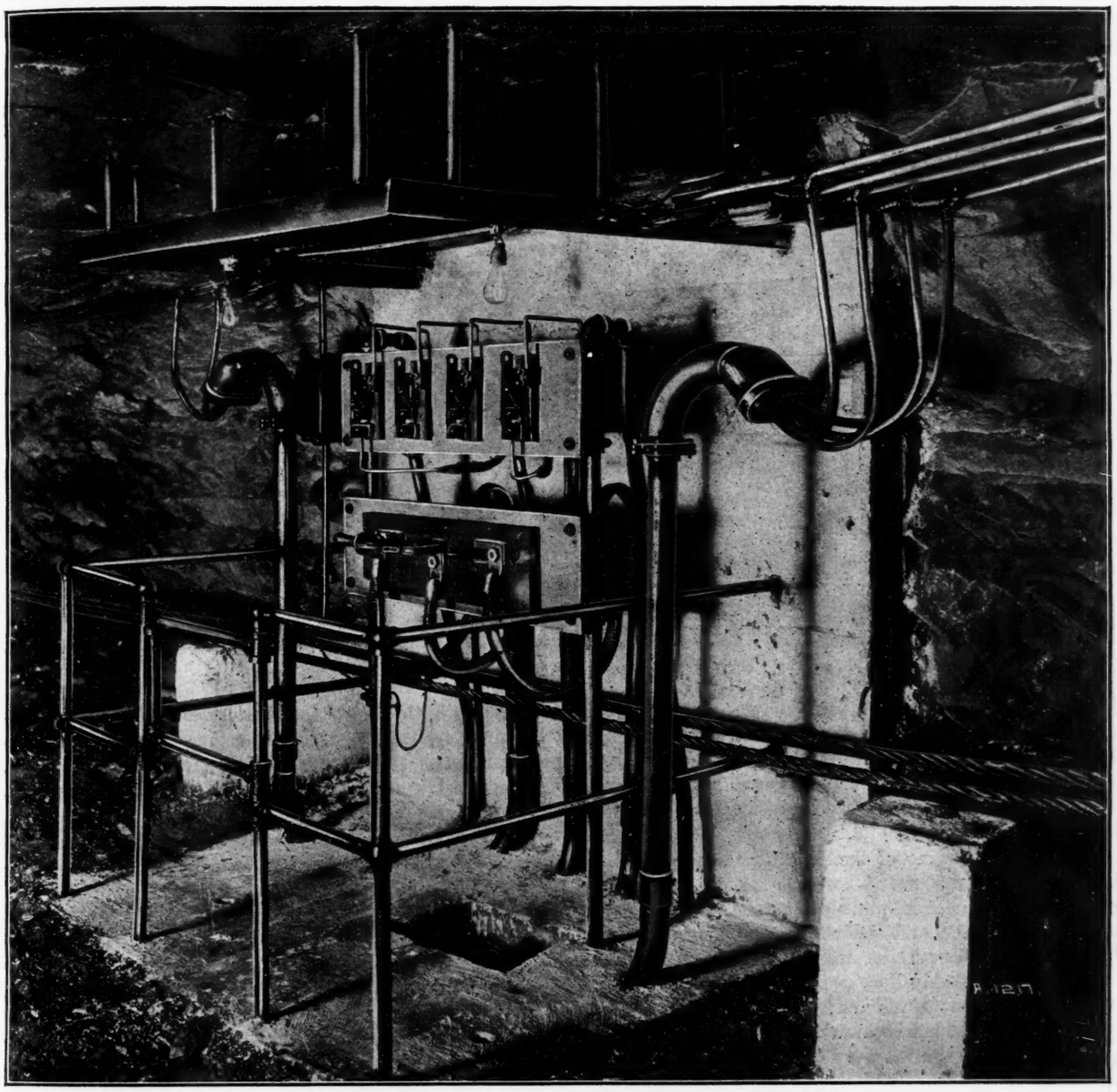


FIG. 7. DISTRIBUTING BOARD WITH FEEDER CIRCUITS FROM TWO SUBSTATIONS

indicates, however, that it is not advisable to allow the pressure to drop below about 180 volts.

Other apparatus driven by direct-current motors of the series type, such as hoisting equipment, will operate satisfactorily under this voltage variation, but if motors not of the series type are used for the operation of any equipment such as pumps, requiring a fairly constant speed, care should be taken to see that these motors are designed to operate satisfactorily under this condition, and it is customary to use what is known as an "accumulative wound motor" for this purpose. This type has in addition to the shunt fields, a series field, so connected as to assist in maintaining the strength of the field when the voltage is low.

The trolley wire is supported by means of special insulators with various arrangements for attachment to the roof or timber. These are manufactured in a variety of forms adapted to meet the different conditions. The grooved trolley wire is ordinarily used. This is rolled in such a manner as to provide two depressions in the wire, the insulator or hanger being so designed that the metal portion below the insulator grips the wire in the grooves. The type of hanger used is entirely a matter of selection and judgment to meet the conditions under consideration.

Protection of Trolley Wire

For the protection of trolley wires, particularly at points where men or animals are required to cross under them, it is customary to install a board on each side. In low veins, however, these boards present a certain hazard in that they are rigidly supported, and if a person's head should come in contact with one of them, serious injury might result. With this in view, a protective device shown in Fig. 8 is being tried out. This consists of a grounded steel messenger wire supporting, by means of heavy twine, a section of second-hand hose installed as shown. This has been carefully tested out when wet and so far has

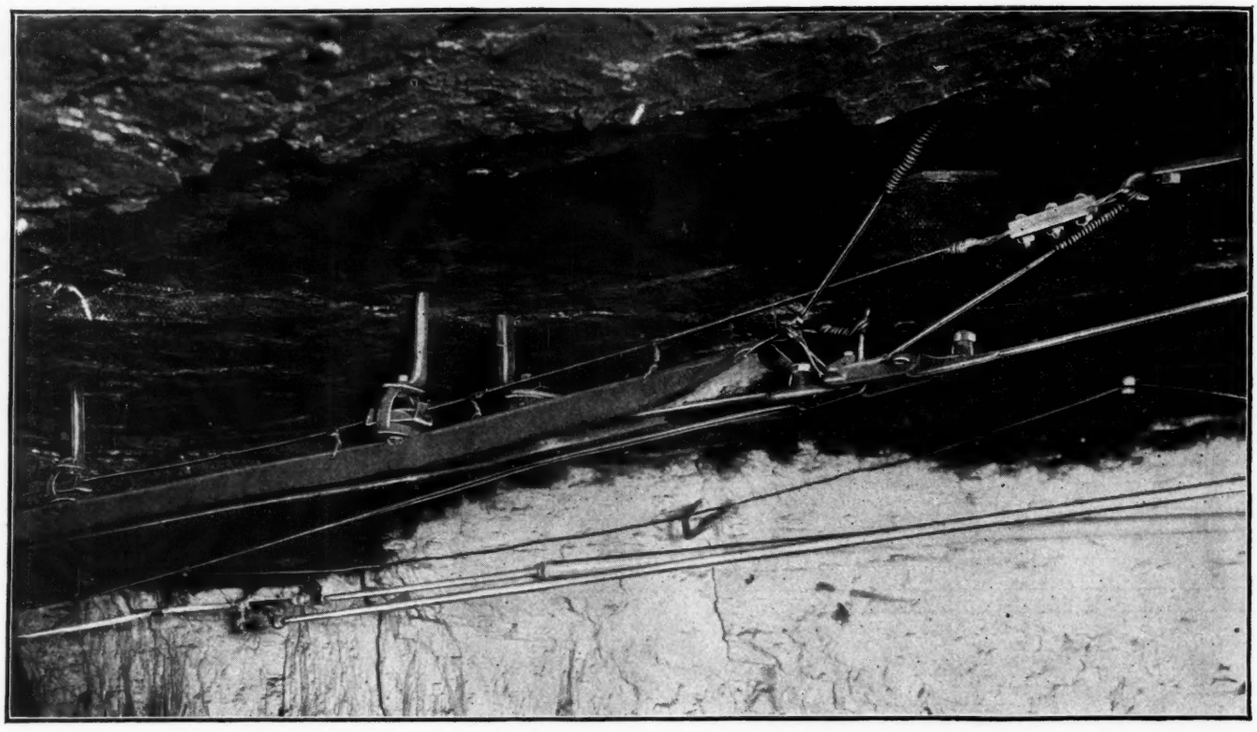


FIG. 8. OLD HOSE PROTECTION FOR A TROLLEY WIRE

indicated that it is a good form of protection. It permits the use of second-hand material and does not present a hard surface. If a person were to cross under this with a drill on his shoulder, the hose would simply turn up against the trolley wire, thus insulating the drill from the conductor.

The proper bonding of the rails for the return circuit is an important feature. There are various types in use, such as the channel-pin, compressed-terminal, pin-expanded, soldered and welded bond. The channel pin is the cheapest in first cost, and for the anthracite-mining conditions is probably the most desirable in the majority of cases. It is not considered as efficient a bond as some of the other types, but because of its low first cost, ease of replacement and limited use of the tracks, as previously referred to, it will undoubtedly prove the most economical in the majority of cases. When the service is heavy and the track is to be used for a number of years, the rails are heavy and the track installed in a permanent manner, the more expensive and efficient type of bond would undoubtedly pay.

It might be argued that by the use of more efficient bonds the return feeders would not be necessary. This would follow, provided these bonds were maintained in an efficient condition, but it will usually be found that fish-plates are frequently left off and the ties are not spaced close enough together to prevent the working of the rails at the joints. And further, cars frequently get off the track, cutting off the bonds. Under these conditions, a return feeder bonded to the track about every 500 ft. is of material advantage.

Naturally, the closer the direct-current substation is placed to the center of distribution of the direct-current feeder system the less the amount of copper required for the low-voltage service. For this reason it is advisable, under certain conditions, to place the substation in the mine. Here again, the first cost must be balanced against the saving in the cost of the low-tension direct-current distributing system, the resultant saving in power and possible increase in labor for operation of the substation. However, it is a paying proposition in certain cases.

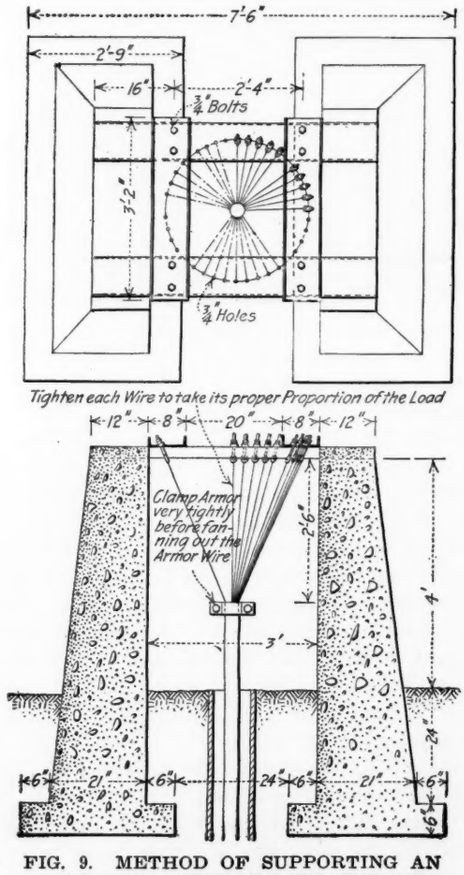


FIG. 9. METHOD OF SUPPORTING AN ARMORED CABLE IN A BORE HOLE

There are some underground substations of this sort. One is located 800 ft. below the surface and is designed to operate from a 16,000-volt three-phase 60-cycle circuit, the power being received through an armored cable suspended from the surface for the total distance and supported entirely by the armor. The method of supporting is indicated in Fig. 9. This has been in service since 1909, but has not operated at a voltage exceeding 8,000, the load on this transmission circuit not being great enough to require a higher voltage up to the present time.

The substation equipment consists of high-tension automatic switches inclosed in fireproof compartments, step-down transformers, and two 200-kw. rotary converters, with necessary switchboard equipment and starting panels. The high-tension cable is three-conductor, insulated with varnished cambric, lead-covered and armored. It has never given any trouble.

Now that the manufacturers are producing high-speed rotary converters that can be purchased at a unit price considerably lower than the older types, and considering the high price of copper, there are good reasons for installing substations more frequently than in the past.

Burning Pulverized Culm at the Mines

By Reginald Trautschold

The problem of burning pulverized culm is very similar to that of burning pulverized coal of larger size, which is receiving so much attention by some of the most important manufacturing interests in the country and the world over. The problems that such consumers have had to contend with must likewise be overcome by the operators burning pulverized culm at the mines; culm and the larger coal pulverized by these other experimenters are not very dissimilar. In fact, in some mines culm is actually a richer fuel than some of the larger coals, and frequently it contains more heating value than does buckwheat No. 3. The difficulties encountered in burning pulverized richer coals must also be present in burning pulverized culm and may even be aggravated by the lack of homogeneousness of the culm.

The chief difficulty in satisfactorily burning pulverized coal is the intense heat generated, this also being one of the results it is desired to attain. This great heat destroys the highest grade of firebrick, while the ashes are fused into liquid masses that are exceedingly difficult to care for in any ordinary type of furnace. Especially designed and constructed furnaces have been devised which have overcome these difficulties in large part, but they are naturally expensive and not yet commercially available; furthermore, it would be impractical to install them in any locality in which the price of coal was not high.

These difficulties would be encountered in burning pulverized culm and probably to an aggravated degree. Culm is not a coal prepared for the market and must therefore be quite variable in its heating value. Some culm possesses great heating power, another containing so much foreign matter that it is a poor fuel, carrying a great deal of ash. Culm of low heating value might not develop the intense heat of the better grade of pulverized coal, and its ash content would be considerably higher.

The heat liberated by one lot of low-grade culm might not destroy the firebrick or seriously fuse the ash, while the next lot might be of exceptionally high heating value and not only destroy the firebrick and fuse its own ash, but also fuse some of the ash content of the poorer lot. The pulverizing of the culm would tend to make it much more homogeneous, it is true, but not sufficiently so to enable the user to count on a uniform mixture. At one moment it might burn satisfactorily and the next the results might be quite different.

Even should a method of successfully burning pulverized culm without undue destruction to the furnace be devised, another serious consideration affects the feasibility of such a fuel for use at the mines, and that is the cost of pulverizing. To successfully pulverize culm or any other coal, it must first be thoroughly dried. The dry culm would then have to be pulverized, a process consuming power, and then suitably stored before it could be fed to the burners. A pulverizing plant capable of most economically performing these various operations would cost anywhere from $1,500 to $3,500 per ton capacity per hour. The burden of interest on investment, depreciation, renewals, insurance and taxes on such a plant would represent a charge of 8 to 18c. per ton of culm pulverized when operating the plant efficiently and for the probable necessary number of hours per day.

These figures are obtained from actual results at various efficiently operated manufacturing plants equipped with every device for the reduction of costs. These plants had efficient systems of conveying and elevating machinery, somewhat more elaborate than are generally found about a coal mine; it is probable that the culm-pulverizing plants at the mines would employ more labor, thereby bringing the initial cost of the plant nearer the lower limit of $1,500 than the upper amount of $3,500 per ton capacity per hour.

The cost of operating pulverization plants in manufacturing establishments has varied greatly, running from as low as 35c. per ton to as high as 80 or 85c. A favorable average is about 50 or 55c. per ton, but it is very doubtful if a plant without efficient conveying machinery could do better than 85c., while it is probable the cost would run over 90c. per ton. In fact, about the best cost for pulverizing culm upon which an operator could figure definitely would be close to $1 per ton, including, of course, the burden imposed by the installation of the plant. This is in excess of what he is usually willing to accept for any of his buckwheats except No. 1.

These figures, which have been repeatedly verified, do not include the increased expenses entailed in the more rapid deterioration of furnaces, the necessary outlay for new equipment other than for the pulverization plant itself, and the numerous other expenses that invariably arise when a change is made in the kind of fuel consumed. Under such conditions, it is difficult to see how the consumption of pulverized culm would benefit the operator or how the general adoption of such practice by the majority of operators can be expected.

It is to be noted, however, that these rather detracting facts pertain to the use of pulverized culm at the mines; it is quite probable that the general use of plain culm, if sufficiently dried, would prove a decided economic advantage.

Accounting and Engineering Show Results

SYNOPSIS—The method of accounting adopted by a mining company may mean all the difference between success and failure. The best results are obtained when the executive, accounting and engineering departments work in unison and in harmony.

A man who does not keep books properly, so that he really knows whether he is making a profit, may sometimes be induced to believe that he is successful in business. In the long run, however, he is sure to discover his mistake. The adoption of a thorough cost-accounting system has caused many coal operators to find that a business which was generally thought to be successful was in reality on the high road to bankruptcy.

Many coal-mining concerns charge off nothing for depreciation. They have no adequate bookkeeping. They really do not know, at any time, how they stand. They price their coal arbitrarily and, in order to secure contracts, often sell at a loss or at least at no adequate profit. It is surprising how some coal-mining men who are generally given credit for uptodateness have sometimes been able to run their business year after year, believing and causing others to believe that they were making substantial profits on the coal they sold when, in fact, they were not even making both ends meet.

Cost Rose from 66c. to 97c. a Ton

I have in mind at present, an operator who in 7 years developed his property to the point of being able to market two million tons of coal per year, more or less. At the end of this time, for reasons that have nothing to do with the subject in hand, it was thought necessary to shed a little more light on the business and a new and thorough bookkeeping system was introduced. It was discovered that the average cost of coal since the beginning of operations, which was thought to have been 58c., had in reality been 81c. a ton. Worse still, during the last of the seven years, considered separately, the cost had risen to 97c. a ton instead of to 66c. as the operator believed.

It is the story of this company, an important one in an important coal state, that I want to tell in order to show how, from an inefficient and unsuccessful operation it was transformed into a paying concern.

The old bookkeeping department had never charged off a single cent for depreciation. Hundreds of mine cars that had long before been scrapped or lost, carloads of steel rails and tons of copper wire, lost under squeezes in two of the mines, continued to appear on the inventories invoiced at their purchase price. Tipples and bins, bridges and trestles, standing since the mines had first been opened, having been built of hemlock, were nearly falling of rottenness. They would have fallen down before had they not been reinforced at different times. These structures were carried on the inventories at their first cost plus the amount of money spent to repair and reinforce them. Lastly, all the acres of coal that had been worked out or lost by squeezes were still considered as of the same value as on the day they were purchased.

When the new accounting system was established, it was found necessary to determine how many acres of coal had been worked out. To arrive at this was impossible with the maps and engineering data at hand. The existing maps were of no value and misleading. The company never had employed engineers worthy of that name—never had employed any, in fact, for more than a few weeks at a time twice a year, when the law made it compulsory to furnish the state mine inspector with extended maps.

Real maps had now to be made. As these were wanted in a hurry, several surveying parties were employed. While they were at work, they ran the crop and property lines and got hundreds of elevations inside the mines as well as on the crop line outside. The maps that resulted from this extensive work supplied the accountants with all the information they so badly needed. They furnished, besides, many other data and disclosed some remarkable facts. For example, in two instances main entries had been driven under an important stream at places where the cover was too thin. This could have been easily avoided had the management been in possession of the necessary engineering information.

This blunder brought a large quantity of water into the workings of several of the mines—workings that had gone to the dip instead of rising as had been anticipated when the mining scheme was first laid out. This error of judgment was explained when the new maps showed that the full dip line was, in reality, 55 deg. off its supposed course. The irruption of water into the dip workings had resulted in the company spending, in three or four years, an amount of money which it would not have been necessary to spend had it devoted, in time, the hundredth part of it to pay for the right kind of preliminary engineering.

With a view of draining by gravity the dip workings, a pair of entries had been started from the head of a ravine outside, toward the point which it was thought, and for a long time would be, the lowest in the wet workings. This work was started at an elevation in the ravine 22 ft. higher than the point it was desired to drain. The management was also misinformed as to both course and distance, but kept on driving during three years, until the new map showed the uselessness of proceeding with the work. By this time there had been spent on this drainage scheme an amount of money that would have maintained a first-class engineering corps during the whole of the seven years the company had been in business.

Squeezed Areas Were Falsely Labeled

As I have said, two of the mines had suffered from squeezes under which large quantities of steel and copper were lost. Neither the president nor any of the other officers of the company knew anything about this until the new maps reached their hands. On the old maps the squeezed areas had been marked "Worked out." This had been sufficient to conceal the fact that many acres of high and good coal and thousands of dollars' worth of serviceable material were lost through somebody's carelessness and mismanagement. Moreover, the presence of the squeezes made access to some rich parts of the property a difficult and costly matter.

The discovery by the directors of conditions that had existed for several years without being reported resulted in several employees, including the general superintendent, leaving the company's service. A new set of men took charge.

The plan for continuing the development of the mines beyond the stage they had then reached was simply a rearrangement of the old scheme to make it suit better the newly discovered course of the full rise line. Everything underwent a twist of 55 deg., the courses of the entries and rooms in the new parts of the mine being set 55 deg. off the courses of the corresponding entries and rooms in the old development. This change left here and there a few triangular areas from which no immediate tonnage could be expected. Of course this coal was not lost—it had simply to be left where it was for the time being. This in itself was sufficient to reduce somewhat the output of the mines, but it could not be helped and was not of much importance, considering the benefit resulting from the change of plans. It would not have been felt at all, in fact, had the old management kept the driving of entries sufficiently ahead of the rooms, which was far from being the case.

It is easy to believe that in an organization where it had been possible to do the things mentioned previously, there must have been many other things that were not quite as they should have been. The development had been so sadly neglected that it had been found necessary to crowd two and even three men into places wide enough only for one or two. Miners do not like to be crowded. In order to prevent them from grumbling, they were allowed to widen their places *to suit themselves,* so that rooms that should have been kept under 20 ft. in width were widened to 30 and even 35 ft., thus reducing the thickness of the pillar to 20 and 15 ft., respectively. "Gouge holes" were allowed in the ribs of the rooms on the track side. To make it easier for the men to load the coal, a turn and a short piece of straight track were laid near to and parallel with the face of each room, on which two cars could be loaded simultaneously.

Any decent engineering service would have recorded such a change in practice and, by putting it on the maps, gouge holes and all, would forcedly have called the "Old Man's" attention to it. But as I have said before, mining engineers were kept out of those mines. Engineers in general, the trustworthy ones in particular, are most disliked where there is most to conceal.

Gouge Holes Probably Caused Squeezes

The gouge-hole and extra-wide room practice I have just mentioned had evidently been responsible for the squeezes that had occurred in the past. In order to avoid a recurrence of this kind of trouble and at the same time make the pillars recoverable, all the driving rooms were reduced to the maximum permissible width of 20 ft. This necessary measure forced many men to temporarily seek work elsewhere. The tonnage of the different mines was appreciably reduced, though not in proportion to the number of men who had left.

Two men in a 20-ft. room will load more coal each than would each of three men working in a 30- or 35-ft. place. Better discipline and greater efficiency in the gathering of loads and the distribution of empties were inaugurated at the same time the number of men in each place was reduced. The result was soon apparent. Each miner loaded nearly two tons more per day than he had ever been able to do before. The cost, instead of increasing when the output was reduced, was soon brought down to a satisfactory figure.

One reason for this was evidently the abolition of a system that had always favored the men who had been in the habit of running the biggest accounts in the stores of the company. As always happens in such cases, many worthless fellows were kept on the payroll for the sole reason that they owed the store big accounts. In order to help them square their dues, they were paid large wages for doing practically nothing.

By observing the rule of employing only as many day men as were necessary and discarding all those who did not earn their money, the new management was able, after the first month, to cut down the cost of day labor from 31c. to 13c. per ton. By day labor, in this case, is meant all that goes on the payroll except mining and loading coal, and yardage.

There should never have been any yardage paid in these mines, but there had been something thus called carried on the payrolls ever since the company had started in business. The officers had acquired the habit of paying the miners for doing different things that the neighboring coal companies had always been able to get done without disbursing a cent. The abolition of the so-called yardage caused another reduction of 2½c. per ton.

The New Plan Succeeded

Reducing the cost by over 20c. a ton at a time when the tonnage was forcedly, though temporarily, reduced to a comparatively low figure, was a most welcome achievement. There were no kicks and no complaints from any quarter except from the manager of the stores, who had been accustomed to consider as real assets and fixtures most of the men whose services had been dispensed with, since they gave the company little or nothing in return for the liberal wages they were receiving. The store manager himself, however, stopped criticizing when he saw the satisfactory turn affairs were taking—a turn that was going to bring to the stores more business than they had ever done previously.

As the development work progressed in the new zone of workings, the output increased. In a little over a year all the men who had left had been taken back, and the mines were loading more coal than they had been able to load at any time in the past. The cost had fallen to a figure lower than it had been during even the first two or three years of the company's existence, although the shortest main haul was now 4,900 ft. long.

These satisfactory results as to tonnage and cost were obtained without great exertion on the part of anyone, just by continuous alertness and watchfulness, keeping everything and everybody "straight," and keeping the engineers on the job all the time. One of the well-defined duties of the latter was to regularly supply the chief accountant with the most complete and minute information with a view of enabling the bookkeeping department to establish promptly at the end of each month detailed cost sheets (one for each mine and a general one) that were most useful to the general superintendent and his subordinates in their efforts to keep the expenses down to the smallest figure compatible with safety and efficiency. Fresh blueprints of the mines supplied to all the officials including the assistant foremen, kept everybody posted

month by month on the progress of all the workings down to the smallest detail.

These prints showed such things as props or any material in danger of being lost under falls or otherwise, unsafe electric wires, steel rails sticking from under falls, broken cars laid by the roadside, pools of water on haulages and manways, dangerous places, high temperatures, places where solid shooting was being done, conditions of ventilation in the different places and the like.

Thanks to the close union and complete harmony that developed between the mining, accounting and engineering departments, everything became as perfect and efficient as it had been loose and wasteful in the old times when bookkeepers and engineers were not allowed to take any share in the management of the mines. The results of this close union and harmony are large tonnage, low cost and mines that are among the safest in the world.

Some interesting light on profitless concerns is obtained from a review of the returns made to Uncle Sam under the corporation-tax law. Out of 250,000 manufacturing and trading corporations in the United States, over 100,000 reported no net income whatever. It may be wondered how many coal concerns are represented in this latter figure, and then we may well reflect whether the failure to show income is due in any way to poor accounting advice.

Coal and Coke in Alabama; Output in 1915

The output of coal in Alabama in 1915, according to C. E. Lesher, of the United States Geological Survey, acting in coöperation with the Alabama Geological Survey, was 14,927,937 short tons, valued at $19,066,043. This represents a decrease of 665,485 tons, or 4 per cent., in quantity, and $1,783,876, or 8 per cent., in value, compared with 1914. During the early part of the year many of the Alabama operators, less hopeful than the others, contracted for the sale of their output at lower prices than previously, with the result that the average value for the year decreased from $1.34 per ton in 1914 to $1.28 in 1915. The number of men employed decreased from 24,042 in 1914 to 22,591 in 1915 and the average number of days worked per man from 226 to 223.

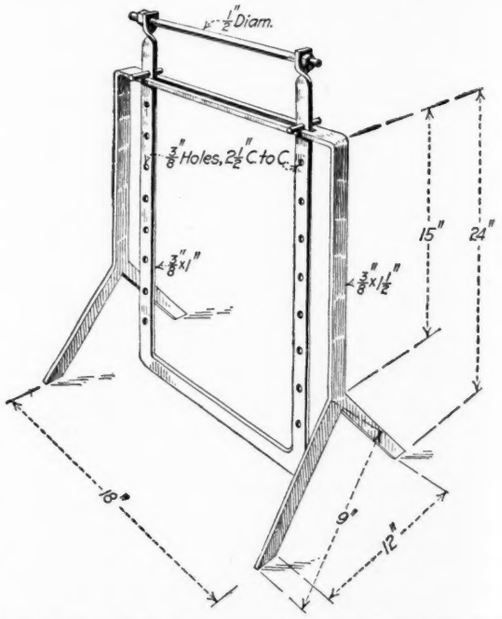
The demand for Alabama coal was very light during the first half of 1915, and many mines were shut down. In August, however, marked activity began in all lines of industry, and the general resumption of operations by practically all the Alabama iron furnaces was a large factor in increasing the production of coal for the year, though the total was less than in any other year since 1909. In ordinary times Alabama supplies a large amount of coal for steamship bunkers at Pensacola, Mobile, Gulfport and New Orleans, but since the European War began there has been little call for coal for that purpose at those ports. The development of water power on a large scale in Alabama has also cut off the market for a large quantity of coal.

The quantity of coke produced in Alabama in 1915 was 3,071,811 short tons, a decrease of 12,338 tons, compared with 1914. The output of beehive coke amounted to 1,001,477 tons, a decrease compared with 1914, but the quantity of coke produced in byproduct ovens increased from 2,031,535 tons in 1914 to 2,070,334 tons in 1915. To produce this coke 4,695,938 tons of coal were used—1,708,228 tons in beehive ovens and 2,987,710 tons in byproduct ovens.

More than 96 per cent. of the coke made in Alabama is consumed within the state. According to reports to the United States Geological Survey, however, small quantities were shipped to 14 other states in 1915, some going even as far west as the Pacific coast, and a small quantity was also exported.

Steel Rest for Blacksmith Shop

In the accompanying illustration is shown a stand for supporting long steel, rods, etc., in the blacksmith shop when working with them at the forge or anvil. This stand has the advantages over the many "one-legged" forms used, of being more stable and considerably wider, and yet it is simple to construct. The supporting piece



DETAILS OF A SIMPLE BUT PRACTICAL STEEL REST

is made of ⅜x1½-in. flat iron, the yoke of ⅜x1-in. flat iron. The latter is passed through a slot in the horizontal part of the supporting piece before the ends of the yoke are twisted at right angles, as shown, and the rod passed through these ends. By means of the holes in the vertical members of the yoke and two nails, the support can be held at any desired height.—*Engineering and Mining Journal.*

Pitch Has Been Used to Enrich Gas, by T. Duxbury, of Oldham, England, as described in a discussion before the Manchester District Institute of Gas Engineers. A large quantity of pitch had collected for which there was no sale, and it was decided to try to carbonize it by mixing 5 and 10 per cent. of ordinary pitch with the coal in West's air-stoking machines and horizontal retorts. The calculations were made on the coal and not on the weight of the mixture, the value of the pitch being regarded as negligible. The gas per ton of coal was not increased apparently, but its calorific value rose from 581 B.t.u. for the neat coal to 594 and 626 with the mixtures of 5 and 10 per cent. pitch respectively. The candlepower also rose from 16.20 to 16.73 and 17.38. The coke increased from 1,489 lb. to 1,556 and 1,614 lb. per short ton, and the tar obtained rose from 12.86 to 16.61 and 19.02 gal. In every case the coke was good. Similar results were obtained with a like percentage of hard pitch.

Accidents Due to Carelessness

Would Not Obey Instructions

By H. L. F.

Two men were employed in one of the entries of our mine to shoot the rock. They had a habit of visiting rooms during the night. The mine foremen and the fireboss had cautioned them not to do so, as it was dangerous. Yet they persisted. Several times the fireboss had told them not to go on these prowling expeditions. The mine generated gas, but the ventilation was so good that as fast as the gas was generated it was swept away. They had confidence in the ventilation.

But one night someone else disobeyed orders, and the combination of two disobediences proved fatal. In going out from their work on the entry above, the men had left a door open, which caused the entry in question to be cut off from the air current. But no one had discovered the mistake, and the two men went to their work as usual. They had loaded two cars and made a rock shot.

While they were waiting for the smoke to clear, one of them started on his prowling expedition. He had plenty of tools in his place and plenty of supplies. He had no legal occasion to go into another man's place. But prompted by curiosity, he went up into the room nearest the face. There was a feeder in that room, and the lack of ventilation had allowed the gas to accumulate. No one will ever know just how it happened, but there was a local explosion in that entry, which snuffed out the life of one man and burned the other badly. The one who survived owes his life to those of his companions who worked faithfully to resuscitate him after they found him apparently dead. He will lose at least six months because of his partner's folly. The very men who had cautioned them against such dangerous practice were the ones who worked hardest to help them.

The coal-mining industry is charged with the death of one man who practically committed suicide. Accidents will happen in all lines of work, but many of them may be avoided and the number reduced to a minimum by obeying the orders of those in charge.

Two Miraculous Escapes

By "Surveyor"

I have been greatly interested in the mine-accident stories that have been appearing in *Coal Age* recently, and to the list I should like to add a couple of occurrences that befell a surveying party.

We were setting lines in a narrow working place, and two of us had just passed through a brattice screen in a road leading to one of the places. The entry was 12 ft. wide, with the track on one side and the space between the track and the coal wall packed tight with timber, leaving just enough room for a manhole. About 15 ft. farther ahead, another screen was hung to a board stopping. The point of a turnout to the left projected through this screen. Immediately after we had passed the first screen, there was the sound of a car coming at a rapid rate and this caused us to squat down into the manhole and allow the car the right-of-way.

At the moment when the car was about 10 ft. on the other side of the second screen, both of us saw at the same instant three sticks of permitted explosive lying on the point of the turnout.

There was no time to get it out of the way, and although we shouted and whistled to the man behind the oncoming car, he could not stop, but he got out of the way himself, while we crouched down in the manhole right alongside the track, waiting for the shock of the blast. To our astonishment nothing happened. The wheels of the car cut through the sticks of the explosive and ground them on the rail. But they failed to explode. The dynamite was there because of the carelessness of a miner carrying a powder can in a slovenly manner and dropping some of his supply on the road.

The second instance occurred the same day. A party of four were going to the surface in a cage holding only that number and protected with the usual shield. All four were on the cage platform, and the engineman had been signaled to go ahead. Most enginemen pause a moment after getting that signal, especially at night, when the usual man at the bottom may have left. During that moment we heard the coming of something falling down the shaft, striking the timber on one side after another. The noise increased as the body fell, and then the cage started to move upward. Two men jumped off and narrowly missed being crushed between the cage and the lintels. Two remained on the cage and miraculously escaped being struck by a heavy rock which penetrated the shield.

After reaching the top it was discovered that a surface workman had dropped a hammer down the shaft and this had dislodged some loose rock that it happened to strike on its wild career downward.

Recent Legal Decisions

Obligation to Safeguard Employees at Tipple—A coal company is liable for death of a carpenter at work at a coal tipple, resulting from negligently dropping coal cars down an incline track under the tipple at irregular intervals without warning or notice to him and without adopting any measure for his protection, decedent having been ignorant of the customary method of handling cars at that point. (West Virginia Supreme Court of Appeals, Hall vs. Boomer Coal and Coke Co., 87 Southeastern Reporter, 1016.)

Cross-Timbering and Setting Props in Kentucky Mines—If according to custom it was the duty of a coal company, which had awarded a contract for removal of coal from its mine at a fixed rate per ton, to cross-timber and set props in a room neck where one assisting a contractor was working, responsibility to such assistants for breach of the duty could not be evaded by agreement requiring the contractor to do the work. (Kentucky Court of Appeals, Hill vs. Carter Coal Co., 179 Southwestern Reporter, 2.)

Quality of Coke Required Under Sales Contract—Under a contract for sale of "48-hour Federal West Virginia furnace coke," with provision for monthly deliveries and agreement that the buyer might cancel as to further deliveries if they should not be up to the quality shipped the first month or two, there was no warranty as to the quality of the coke to be delivered during the first one or two months, in the absence of proof as to the meaning of "48-hour furnace coke." There was conflicting testimony as to the meaning of that term, some of the witnesses stating that it must be coke not exceeding 1.25 in sulphur, for blast-furnace use, while others testified that it carried no guaranty of sulphur content. (Massachusetts Supreme Judicial Court, Federal Coal and Coke Co. vs. Coryell, 111 Northeastern Reporter, 1041.)

Extracts from a Superintendent's Diary

My children are not the happiest children in all the world. Like all normal children, they crave the unrestrained companionship of children of their own ages, but they rarely receive the full confidences of their playmates.

Too often these playmates go to extremes; they either pamper them or ostracize them.

As a rule children begin life as disciples of their parents; if the father is a believer in the claims of the I. W. W., the sons have little respect for law and order and rather boast of exploits that border on lawlessness. Naturally such boys, fearing that the "super's" kids might squeal to the "super," avoid their confidences, and as a consequence the "super's" kids are in despair whenever they are given the cold shoulder by these adventurers.

Once one of my boys (10 years of age at that time), becoming desperate under such treatment, planned a little adventure of his own. It wasn't exactly highway robbery, but it could have passed as such in the dime novels that I found in his possession after the smoke of battle cleared away. We finally succeeded in bringing the boy's ideas of permissible adventure back to normal, but we had a most trying time of it.

At the other extreme are the children of parents who have an exaggerated opinion about the importance of a man's occupation. Such children bow down to the "super's" kids, generally very much to the disgust of the kids so favored, and they show their disgust by avoiding such admirers at every opportunity.

One day my wife is in tears because some of the young ruffians of the camp have maltreated one of her sons, and the very next day probably the wife of one of our salaried men comes over in tears to complain to my wife that our son, who fared so badly only yesterday, had today tormented her son until he is threatened with nervous collapse.

This tendency in children to torment certain of their fellows is incomprehensible to grown-ups, as is also the meekness displayed by the injured ones.

Another circumstance that brings much humiliation to my sons is the number of kids in the camp who have been named for them, and who, because of the fact, seem to think that some kind of invisible kinship exists between them.

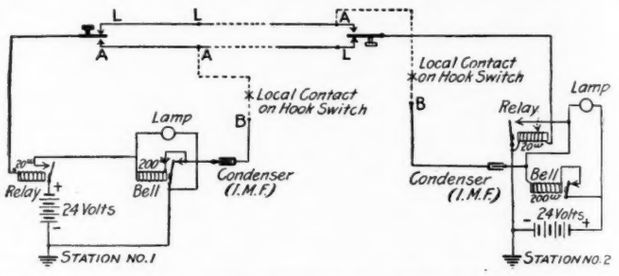
During the early years of my mining experience it gave me untold pleasure to have one of my men name a son in my honor, and likewise my wife felt highly complimented when a son was followed by a daughter named in her honor. To my mind at that time it was the strongest possible evidence that I was popular with my men, and I have always been a great believer in the importance of hero worship. But when things progressed to a point where every one of our children was likewise honored by a number of different families, the honor was robbed of any significance and the complications following the confusion of names gradually became more troublesome.

My oldest son has a namesake in five different nationalities, a circumstance that roused resentment in the breast of his grandfather, who has just ended a visit at our home. The name is a very uncommon one (or at least has been) and has always been looked upon as rather exclusive property of our family by our family.

A Visible and Audible Signal

The following diagram for the simple and positive wiring of a signal system is given in the *Electrical Review and Western Electrician*. It will indicate at the sending and receiving points simultaneously, both by means of lights and gongs.

The self-restoring, three-point keys are simply assembled, or may be procured from any supply house. The relays should be of approximately 20 ohms resistance, and preferably of the knife-edge armature type. A relay of this type operating on a circuit of from 21 to 24 volts is



WIRING DIAGRAM FOR A VISIBLE AND AUDIBLE SIGNAL

very positive in operation, with a current consumption of only from 0.015 to 0.020 amp. This allows of its use on a circuit up to 1,000 ohms resistance one way. The bells should be wound for 24-volt operation and the lamps designed for the same voltage.

If it is desired to use the circuit for telephone communication as well, any standard local-battery telephone connected across the circuit in series with a condenser of 2 microfarads capacity will give the desired result. In the wiring diagram letters *A*, *B* and *L* indicate corresponding terminals.

New York's Coal Consumption

Reports submitted to the Public Service Commission show that during 1915 the electric companies of Greater New York consumed 59,310 short tons of anthracite and 994,821 short tons of bituminous coal and that there was used by the gas companies, with the exception of the Consolidated Gas Co., in the greater city 64,310 short tons of boiler fuel and 282,955 short tons of generator fuel. The report of the Consolidated Gas Co. has not as yet been made public by the Public Service Commission.

The consumption of anthracite and bituminous coal by the individual electric companies in short tons was as follows:

	Anthracite	Bituminous
New York Edison	.....	630,002
Edison Illuminating Co. of Brooklyn	42,005	174,352
The Flatbush Gas Co	15,347	1,963
Queens Borough Gas and Electric Co	.....	12,315
The United Electric Light and Power Co	.....	147,689
Bowery Bay Electric Light and Power Co	1,675	.....
Longacre Electric Light and Power Co	283	.....
Richmond Light and Railroad Co	.....	28,500
Total	59,310	994,821

The tonnages used by the gas companies were as follows:

	Boiler	Generator
Brooklyn Union	37,693	243,398
Queens Borough Gas and Electric Co	2,628	5,448
The Bronx Gas and Electric Co	10,362 (Steam)	3,315
	114 (Gas)	
New York & Richmond Gas Co	3,098	6,816
Brooklyn Borough Gas Co	2,886	6,722
Kings County Lighting Co	4,529	17,256
Total	61,310	282,955

Anthracite-Price Inquiry

By an Anthracite Retailer

The commission authorized by joint action of the State Legislature on June 15, 1915, has at last started its investigation into the increased cost of anthracite. It was known that some months ago it had requested the leading shippers of anthracite for a list of all the retail coal dealers in this district, and it was thought this was for the purpose of selecting a certain number to appear before the commission. However, instead of this the retail men were greatly surprised during the current week to receive a form letter from the commission, signed by J. Paul MacElree as counsel, a copy of which follows:

The commission appointed by the Governor of the commonwealth to investigate the causes of the increase in the cost of anthracite coal and to report the same to the Governor and to the Legislature on Jan. 1, 1917, desires to notify you that it wishes to secure certain facts from the dealers in anthracite coal. To that end the commission requests you to furnish it with the following information:

1. The price per ton paid by you for the different sizes of anthracite coal on Jan. 1, July 1, Sept. 1, 1913; Jan. 1, 1914, 1915 and 1916.

2. What were the prices at which you sold coal of various sizes on these dates?

3. From what operator or operators did you buy coal during the period referred to, together with the quantities purchased and the dates?

4. What increase in cost was paid by you to cover the state tax of 2½ per cent. passed in 1913?

5. How was said increase charged—as a separate item, or merely added to the price?

6. To whom were said increases paid?

7. Has the money so collected on account of the state tax been returned to you?

8. If not, have you made any effort to have the same returned?

9. If said money has been returned to you, what has become of it?

The dealers have naturally commented quite extensively on the letter. As will be observed, the questions are, to say the least, quite intimate ones. As a matter of fact a number of them seem to smack very much of an invasion of the private rights of individuals. When the commission asks for the tonnage purchased by each dealer for the two years beginning Jan. 1, 1913, and then follows with inquiries as to prices charged, it would seem that it is asking for information that is not altogether relevant to the question at issue, particularly as to the tonnage bought, and something that no dealer will answer without some persuasion.

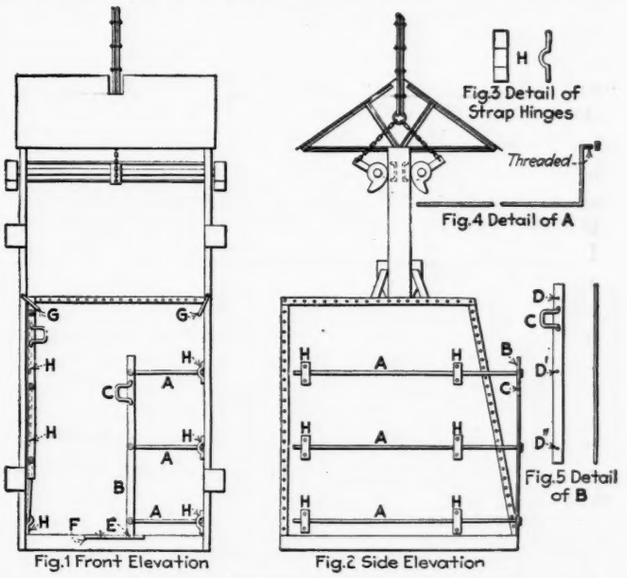
The dealers in this city have always maintained that they did not increase the retail price of coal following the imposition of the tax by the operators, any change made at that time being due to advancing costs of all kinds. They have always felt that the tax, which was but recently returned to them, was rightly theirs and have chafed at the long delay in receiving it and without interest therefor. To ask them what they have done with the money is somewhat akin to asking a child what became of a stick of candy.

It is rather difficult to understand the intention of the commission in sending out the letter. It may be that they thought they could simplify their work by simply tabulating all the replies to the various questions and their task would be done. This would be very good indeed if the dealers answered the questions, but at present it seems that they will not do so without some pressure being brought to bear. After consulting counsel, opinion seems to be that they will ignore the request.

Folding Safety Gate for Cages

The safety gate shown by the accompanying sketch is used on all cages at the Esperanza and Pilares shafts of the Moctezuma Copper Co.'s mine at Pilares de Nacozari, Sonora, Mexico. The gate consists of few parts and is of extremely simple design. It fully accomplishes the purpose of a cage gate, yet has the advantage of folding back against the sides of the cage when supplies and materials are being loaded.

The cages at Pilares are of the standard all-steel design, and while employed to some extent for raising ore in cars, they are used principally for the transportation of men and supplies required in the mine. The cages have



FOLDING SAFETY GATE FOR CAGES

a single deck just large enough for one steel mine car of the usual 20-in. gage, end-dumping type. The back and two sides of the cages are covered by steel plates bolted to the frame extending above the cage floor to a height of 4½ ft.

Each half of the safety gate is bolted by iron straps, detailed in Fig. 3, to the steel siding of the cage. The bent bars *A*, of which there are three for each side of the gate, are made of ¾- or 1-in. round stock 4 in. less in length than the side length of the cage plus one-half the front width. Each bar is bent at right-angles at a distance from one end equal to 4 in. less than half the width of the cage, and again at a distance of 2 in. from the same end, so that the bar has the form shown in Fig. 4. The short right-angle bend is threaded to receive a nut. The other member making up the rest of half the gate, detailed in Fig. 5, is a straight bar of steel *B* ⅜x2 in., 4 or 4½ ft. long, with a handle *C* riveted or bolted to it at a convenient height, and with three holes *D* for the side bars, which are bolted in as shown in the illustration. Fig. 1 shows one side of the gate folded back against the side of the cage, and the other side let down into position, the lower end of the bar *B* dropping into a rectangular slot *E* in the floor of the cage, a small steel plate *F*, suitably slotted, being attached to the wooden floor of the cage to act as a catch or guide for the bar *B*. When folded back the gate is held by keep *G*.—*Engineering and Mining Journal.*

Suitable Office for Mine Plant

The following is the design and specification for a mine-plant office recently constructed. This building housed comfortably the operating office, engineering office and time office for a property employing about 600 men.

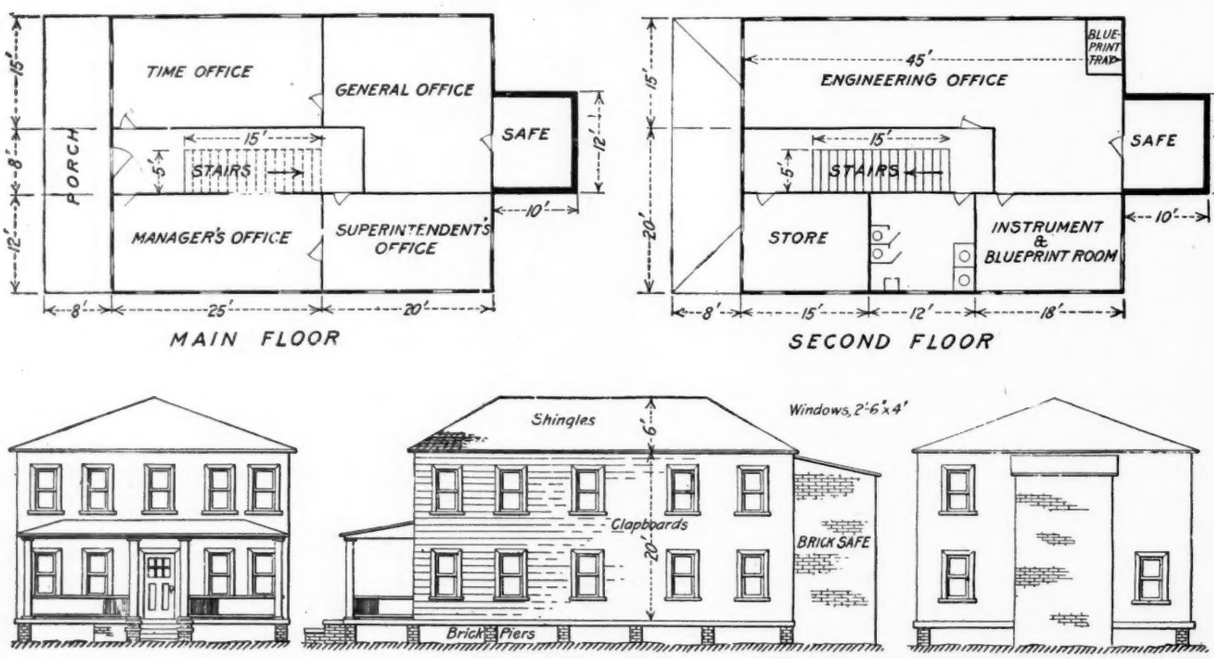
The building itself is of two-story frame construction, 35x45 ft., set on brick piers. A brick vault 10x12 ft., having iron doors opening into the main office on the first floor and the engineer's office on the second, is for the protection of the records from fire and theft. The outside is covered with clapboard, the roof shingled and painted all over. The inside is ceiled throughout with No. 2 grade tongue-and-groove ceiling. All rooms are electrically lighted and steam-heated. The function of each room is self-explanatory.

The sills are 6x8-in. rough timbers; first-floor joists, 2x 10-in. S 4 S; second-floor joists, 2x8-in. S 4 S; studs, 2x6-in. S 4 S; partition studs, 2x4-in. S 4 S; rafters, 2x6-in. rough; doors, 2 ft. 6 in. by 6 ft. 6 in.; windows, 2 ft. 8 in. by 4 ft.

It was found by actual tests that sized lumber for framing is more economical than rough, as the additional cost for material is more than offset by the extra time required to fur and dress the rough framing to get it in condition for ceiling.

A building of this type costs in the neighborhood of $2,000 to $2,500, depending on local conditions. If the structure is to be reduced or enlarged, the approximate cost can be figured by allowing $1.25 per square foot of dimensions and applying this positively or negatively to $2,500, as the case may require.

If built in hot climates it is well to screen the windows and porch and place inverted dishpans on the piers under the sills to prevent insects from entering the office. If built in the north it is well to board in the spaces between the piers to assist in keeping the office warm. A layer of building paper under floors and behind walls is also advisable.—*Engineering and Mining Journal.*



PLANS FOR AN ADMINISTRATION BUILDING FOR A MINING CORPORATION

New Plant Built in Montana*

About a year ago the Roundup Coal Mining Co. completed the sinking of a 12x16-ft. ft. hoisting shaft at what is called the Carpenter Creek Mine, located on Carpenter Creek, three miles south of the Musselshell River in Musselshell County. Between that time and last fall, the mine was fully equipped, so that it is now producing approximately 1,000 tons in every working shift of 8 hr.

The shaft is 181 ft. deep and has two compartments. It is equipped with a steel tipple of the latest Link-Belt design, having a shaker screen capable of screening 2,000 tons of coal per 8-hr. shift. The coal is dropped into the weigh hopper, fed to a reciprocating feeder which distributes it regularly onto the screens, which are all slot-lip design for the smaller grade and round perforations for the larger sizes. The screens are electrically operated, and an electrically driven box-car loader is used on the lump track. A 300-ft. belt conveyor handles the coal to the boiler plant, which consists of three 150-hp. boilers, connected with one 120-ft. stack of 5 ft. diameter. The hoist is steam-driven and has cylinders, 24x48 in. The electric power plant consists of two 100-kw. Economy turbines, 250 volts, d.c.

The underground mechanical equipment consists of three Deming electric pumps, one 7-ton Goodman locomotive and three Sullivan Ironclad shortwall cutting machines.

The vein of coal varies in thickness from 5 to 8 ft., and there are some 30 million tons of coal tributary to this shaft opening. A spur line of the Milwaukee Ry. from Geneva extends across the Musselshell southward about three miles to this line, and the shipping point is called Woodard. By the first of next January this property should be producing regularly in the neighborhood of 2,000 tons of coal per day.

*Abstracted from the address of Retiring President M. H. Gerry, Jr., of the Montana Society of Engineers.

This property is owned by the Roundup Coal Mining Co., of which J. E. Woodard is general manager.

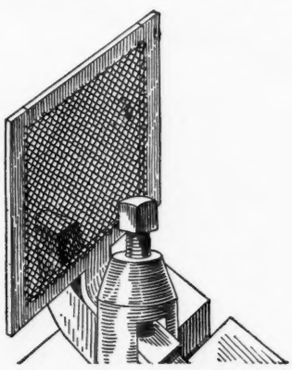
Anaconda Copper Mining Co. (Coal Dept.)—At the Washoe mine of the Anaconda Copper Mining Co., in the Bearcreek field, a complete new screening plant was installed during the year consisting of the latest form of shaking screens, which makes it possible to effect a thorough separation of the large variety of the market sizes. Hoppers to hold the nut and slack were also erected. The screens are driven by motors which derive their power from a 200-hp. Westinghouse turbo-generator set, which was installed for the purpose. This generator, besides furnishing power to the screens, will also drive an electric pump at the foot of the slope and mining machines which are now being installed.

This work was under the direction of F. W. C. Whyte, manager coal properties, Anaconda Copper Mining Co.

Chip Guard for Machine Tools

By William Torray

The accompanying illustration represents a guard for chips. It has been used successfully on lathes. The



A CHIP GUARD

device, which is clamped with the tool in the holder, hardly needs any explanation.—*The American Machinist.*

COMING MEETINGS

National Exposition of Chemical Industries will be held at the Grand Central Palace, New York City, Sept. 25-30, 1916. Managers, Charles F. Roth and Adrian Nagelvoort, Grand Central Palace, New York City.

American Chemical Society will hold its annual meeting Sept. 25-30 in New York City. Secretary, Charles L. Parsons, Bureau of Mines, Washington, D. C.

American Electrochemical Society will hold its annual meeting Sept. 28-30 in New York City. Secretary, Prof. Joseph W. Richards, Lehigh University, South Bethlehem, Penn.

National Safety Council will hold its next meeting in Detroit, Mich., Oct. 17-20. Secretary, W. H. Cameron, Continental and Commercial Bank Building, Chicago, Ill.

Southern Appalachian Coal Operators' Association will hold its semiannual or second quarterly meeting at the Cherokee County Club, Knoxville, Tenn., July 21, 1916, at 12 o'clock. Secretary, J. E. McCoy, Knoxville, Tenn.

The American Mining Congress will hold its 19th annual session during the week beginning Nov. 13, 1916, at Chicago, Ill.

Michigan-Ohio-Indiana Coal Association will hold its annual convention at Cedar Point, near Sandusky, Ohio, Aug. 1, 2 and 3. Secretary, B. F. Nigh, Columbus, Ohio.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its next annual convention on July 26 and 27 at Madison, Wis. Secretary, I. L. Runyan, Chicago, Ill.

Cost of Installing Four Large Electric Mine Pumps

The installation of equipment to handle 9,500 gal. of water per minute, 8,000 gal. of it by centrifugal pumps, furnishes costs of much value. The equipment may be briefly described as follows:

CAPACITY OF THE PUMPS AND MOTORS INSTALLED

Two 3,000-gal. per min. 10-in. six-stage solid bronze centrifugal pumps with a 325-hp. 700-r.p.m. three-phase 25-cycle 440-volt motor for each pump.

One 2,000-gal. per min. 8-in. six-stage solid bronze centrifugal pump with a 225-hp. 700-r.p.m. three-phase 25-cycle 440-volt motor.

One 1,500-gal. per min. 16-in. stroke 13-in. plunger triplex pump with 150-hp. 500-r.p.m. three-phase 25-cycle 440-volt motor.

Total rating of motors, 1,025 hp.

ACTUAL COST OF PUMPS, INSTALLATION, FOUNDATIONS

	Cost	Per Cent.
Pumps, motors, electrical material, etc....	$26,186.49	68.41
Unloading and transporting pumps.....	227.35	0.59
Labor and material expended in foundations, floors and walls.....	2,373.67	6.20
Installing pumps	1,777.29	4.64
Electrical work	1,359.17	3.55
Compressor pump complete and its erection	320.00	0.84
One 18-in. column and one 20-in., each 268 ft. long.....	5,007.32	13.08
Placing column and batteries in shaft.....	315.84	0.83
Lumber for batteries to hold pipe and for shaft studding	281.89	0.74
Hoisting engineers (handling material and column)	427.24	1.12
Total cost of installation.....	$38,276.26	100.00

The bottom of a shaft that had been recently abandoned was utilized for a pumproom, the columns being run up one compartment, and a stairway with landings every 20 ft. being placed in the other compartment. As the amount of steel timber used and the cost of the rock work and sump would vary with different strata, this cost has not been included in the tabulation.

Under normal conditions the 1,500-gal. triplex pump is used to keep down the level of the water in the sump. The total capacity of 9,500 gal. was provided for periods of high water. It is about twice the inflow at such times and so allows a large factor of safety for emergencies or accidents of any kind.

Owing to the acidity of the water to be handled, no commercial foot or gate valves were used, but a priming apparatus with special wood-lined check valves was provided. Long-radius fittings and increasers were used on the piping immediately after leaving the pump, to decrease the friction of the water.

One column line is 18 in. and the other 20 in. in diameter, both wood-lined and flanged cast-iron pipe. The 1,500-gal. and the 2,000-gal. pumps discharge through the 18-in. pipe, and the two 3,000-gal. pumps raise their water through the 20-in. column. Batteries were placed under each 9-ft. length of pipe extending the full length of the shaft.

There are two settling tanks to clarify the water, which then passes through a concrete flume where it empties into the sump. At this point is a gate which can be closed, thereby dividing the sump into two parts, and allowing either portion to be cleaned while the pumps are lifting the water from the other section.

A slope on a 15-deg. pitch has been sunk to the level of the sump from an old gangway. The sediment from the sump is loaded into mine cars and drawn up by a motor-driven hoist. The water lift from the floor of the pumproom to the point of discharge is 268 ft. The pumps supplant two large steam units and were installed during the latter part of 1914 and the beginning of 1915.

Coal Mining in Northern Illinois

Situated but 57 mi. southwest of Chicago, at Braidwood, Ill., on the Chicago & Alton R.R., is the mine of the Murphy, Linskey, Kasher Coal Co. This mine, although small compared with present-day operations, is representative of its kind, especially of those found in the first district of Illinois.

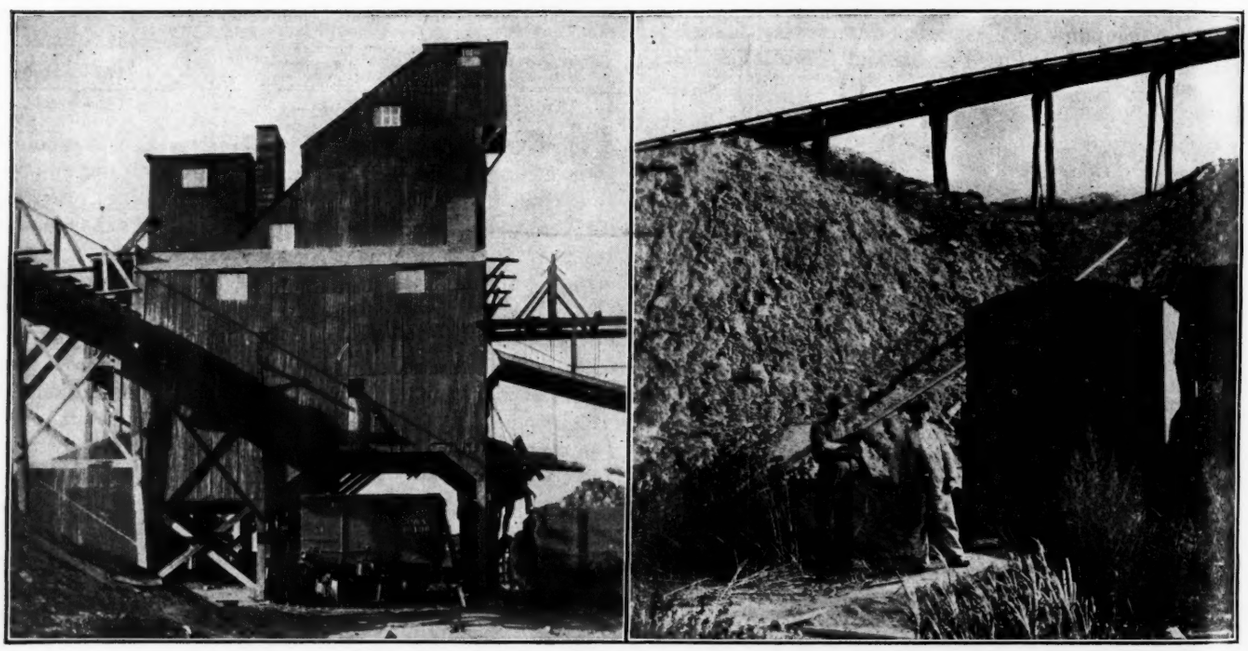
The first district of Illinois is of historical importance, because this region produced the first coal in the state, early operations beginning here about 1857. This coal field for a long time was the leading producer in the state and is today familiarly and best known as the Wilmington field. Moreover, it has the distinction of being practically the only field in the United States where the longwall mining system produces any considerable tonnage of coal.

The present Murphy, Linskey, Kasher Coal Co.'s mine at Braidwood, was opened between 6 and 7 years ago and is operated by the owners, Messrs. Murphy, Linskey and Kasher, each member of the firm being a thoroughly practical coal miner and actively engaged in the daily production. Mr. Murphy is general superintendent and Mr. Kasher is a certificated mine foreman. These two have active charge at Braidwood, while Mr. Linskey is engaged in developing a coal property recently acquired at Pontiac, Ill.

Operations are confined to the No. 2 seam of the Illinois State Geological Survey, which varies from 2 ft. 8 in. to 4 ft., with an average of 3 ft. 2 in. in this mine. The coal measure is here reached at a depth of 61 ft. Bands of pyrites and dirt do not occur with any regularity, but where present these impurities will vary from ½ to 3 in. in thickness.

The output of this mine per day is from 250 to 300 tons, the production for the year 1913 totaling in the neighborhood of 70,000 tons. The shaft is 61 ft. in depth and is lined with timber. The tipple is of wood construction covered with corrugated sheet iron, as is shown in the accompanying illustration. This is a pick-mining proposition and no mining machines or explosives are used. This mine is considered to be nongaseous, and the miners use open lights of the carbide type. Underground it has many modern features, such as the Stromberg-Carlson mine telephones and automatic sprinklers for fire protection. Aboveground there is ample trackage to secure a good supply of cars, which are moved by cable.

Ventilation, which presents but few difficulties in longwall mining, is induced by a 5-ft. Sirocco type of fan, which is well housed in a brick and concrete structure. A Bristol water gage is installed, and readings are recorded continuously. No mechanical haulage has been attempted, mules being used to move the coal from the face to the bottom. The distance from the face to the hoisting shaft at present is slightly over 1,600 ft. Twelve to 15 mules are used during the busy season. They are stabled underground, and the company raises practically enough grain on its 80-acre farm to supply them. The haulageways are roomy and well maintained. Pit cars have a capacity of one ton, and 12-lb. rails are employed.



THE EXTERIOR OF THE TIPPLE AND THE FAN HOUSE, WITH DUMP IN THE BACKGROUND

Three sizes of coal are produced—lump, egg and nut. Approximately 80 per cent. of the product will pass over a 1¼-in. screen. The coal is used extensively for domestic purposes as well as in industrial plants. The high cost of production (in the neighborhood of $1.65 to $1.67 per ton) prevents this coal from being shipped any considerable distance. However, the output is easily disposed of within a radius of 50 mi., the freight rate being 57c. per ton to Chicago.

In the Wilmington field the miner is paid 95c. per ton of coal mined, but he must maintain the roof of his roadway 4 ft. above the rail. The amount of coal produced per employee per day averages a little better than 2 tons. The Murphy, Linskey, Kasher Coal Co. prides itself on its record, since in five years of successful operation it has not had a fatal accident, although employing as high as 130 miners and 30 topmen.

The Labor Situation

General Labor Situation

There are few strikes or other labor disputes in the anthracite region at present writing. The union is gradually inducing the men to realize that the contract they have signed may not be broken at their pleasure. In the unionized bituminous area of central Pennsylvania there is no new trouble, but still in Somerset County and the Broad Top and Johnstown regions there are some idle mines.

In western Pennsylvania just at present the union mines are mostly working and the nonunion mines are trying to make contracts in which the union is recognized, and as soon as that is done they also will be working. The area still idle has been becoming more and more restricted. The union representatives met on Wednesday, July 12, to decide on what action should be taken at the union mines. This meeting was officered by a special committee of the international executive board of the United Mine Workers.

Wage Scale Committee Signs Coshocton Scale

In Ohio the Coshocton scale has been agreed upon and signed by the joint committee of operators and miners. The scale grants, of course, the 3c. per ton increase provided by the McAlpin agreement and the 5-per cent. advance for day and dead work provided in that instrument. The operators' representatives were C. L. Barnes, C. R. Thrapp, R. B. Dennis and R. N. Barnes.

The new Pittsburgh Coal Co. has decided not to collect $1 fines from its miners for having absented themselves in a body to attend the burial of a neighbor. The practice of thus making a festivity out of a funeral has been only too common, and it is felt that the men did not realize that it was a penal act under the new contract. The miners have promised to work in the future when funerals occur, and the incident is closed.

Western Kentucky Miners Vote to Strike

In western Kentucky upward of 4,000 men are idle. The agreement approved by the joint subscale committee and by the international board has been repudiated by a slender majority of 153 votes on a referendum of the miners. The "United Mine Workers' Journal" in an editorial urges the men to go back to work:

The district and international officials, the scale committee and the delegates to the conventions exhausted every effort in the attempt to bring about a satisfactory settlement, and we must concede that the operators have treated with us in a fair and conciliatory spirit; have been patient and considerate, and even now, when a settlement seems distant, are not attempting to work their mines with scab labor.

District 23 adjoins the nonunion field of western Kentucky, the feudal principality of the Atkinson family, in Hopkins and Christian Counties. Possibly in no part of the United States is coal produced as cheaply as in this field. The labor is generally recruited from the cotton fields of Alabama, Mississippi and other parts of the far South.

The "contract system" is in full vogue and the pay of the laborer is less than one-third the equivalent of any man in any union field in this country. And with this coal, produced by the cheapest labor on the continent, the product of the mines of district No. 23 must compete. Only the greater productivity of the more intelligent labor found in the union fields has made competition with the nonunion mines possible, and then only in a degree.

To the south is the great coal-mining field of Alabama. . . . Here are thick, easily worked veins manned by the cheapest of labor. The small remuneration which these workmen receive is returned to the operating companies through the company stores and the company's rented shacks. These are the direct competitors of the operators of the union mines of Kentucky.

On the considerations outlined as above the International Executive Board, after due deliberation, thought proper to advise acceptance of the operators' proposition. The fight to improve the conditions contained therein must be made in the contiguous nonunion field.

In the Southwest no agreement appears as yet to have been made. The provisions of the McAlpin agreement are not of force in the unionized districts of Missouri, Kansas, Oklahoma, Arkansas and Texas. Apparently Oklahoma will refuse the increase in wage and the other states will probably accept it. Oklahoma will leave the association before this is done.

The joint conference at Kansas City has voted down all the miners' demands and the question has been referred to a committee consisting of two operators and two miners for each state. The miners' representatives refused to consider working conditions till the wage advance was conceded.

Peace in Anthracite Region

The unrest which recently troubled the anthracite industry is gradually decreasing and in a short while everybody will be at work. Nevertheless, it must be said that on July 7 1,000 employees of the Philadelphia & Reading Coal and Iron Co. at the Bear Valley shaft near Shamokin, Penn., went on strike to compel the company to reinstate a number of men who had failed to keep the contract recently signed. But such events are few, and as they are growing less numerous, they are not significant. They furnish only an opportunity to express the fact that they are steadily growing less frequent.

At Forty-Fort colliery of the Temple Coal Co. also 600 miners have gone on strike because they wish to use a certain kind of powder. The company officials declare that they cannot furnish the miners with the powder they desire because of the European War.

At the Peck shaft of the Mt. Jessup Coal Co. the miners returned to work on July 7, but they declare that they will strike again if working conditions are not soon modified.

The Anthracite Board of Conciliation having failed to adjust the grievance of the employees at the Highland Mines of the G. B. Markle Co., the matter was placed before the umpire, ex-Judge George Gray. The miners were asking for higher rates for propping and timbering. The arbitrator awarded them a rate of 60c. a yard for the removal of loose slate and rock.

After a strike of about two weeks the firemen employed by the Lehigh Coal and Navigation Co. have returned to work at all mines except No. 14. Despite the fact that the strike was in clear violation of the contract between the company and its men and that the union made it perfectly clear that this was so, the men were put to a severe test of virtue and it is no great wonder they yielded to temptation.

The Lehigh Coal and Navigation Co. has an affiliation, the Lehigh Navigation Electric Co., where the smallest coal that can be burned in practice (to wit, bird's-eye) is being used to raise steam to generate electricity which is distributed in neighboring towns. The electric company is of course not under the anthracite contract, and the firemen it employs are not bound by its provisions. When they went on strike, they were granted $2.25 per diem and an 8-hr. day. As the plant had mechanical stokers, only a few men were employed and the change in wage and the modification in the length of the day made no great difference to the cost of operation.

But the news of the increase spread through the Panther Valley and the firemen of the region immediately became dissatisfied with their contract wages and asked for an increase. Foremen and clerks were pressed into the service to provide the steam for the pumps. The collieries were idle, however, till the firemen tired of their strike.

As a result of the scarcity of labor much difficulty is being experienced at the mines. For the first time for a number of years it is found difficult to get sufficient men to mine the harder veins of coal. As many jobs are offered to the men, they are selecting the particular place where their labor promises the largest return. It is no uncommon sight to see miners on an inspection tour looking over the places available. If conditions are not up to their critical standard, they take their tools elsewhere. Supply prices are unchanged and yardage prices are increased, but not enough to offer a sufficient inducement to some of the miners in these times of labor shortage.

Pennsylvania Bituminous Fields

In the bituminous fields of Pennsylvania conditions have not been so peaceful for weeks as they are at present, and now that the miners of the Pittsburgh district are at work again, it is to be hoped that they will not have to call another strike to get just what the McAlpin contract awards them. It is always unfortunate when an agreement is broken owing to a determination on either side to hold itself immune from the provisions of its contract, and it is certain that most of the operators would rather submit to the little injustice in

the framing of the McAlpin contract than proclaim themselves as violators of that agreement which they so recently signed.

A special convention of the miners of the Pittsburgh district was held at the Moose Temple in Pittsburgh on July 12. The meeting was in charge of the committee of the international executive board and not of the local officials. The miners, it will be remembered, were to have held a special convention in the Union Labor Temple on July 1, but this meeting was canceled.

The committee of the international executive board included John L. Lewis, of Springfield, Ill.; Adam Wilkinson, secretary of the international executive board; James F. Moran, of Des Moines; William L. Harrison, of Birmingham, Ala.; and Thomas Haggerty, of Reynoldsville, Penn.

On Pigeon Creek in Washington County, at Hazelkirk No. 2, 350 miners employed by the Pittsburgh-Westmoreland Coal Co. went on strike July 6 in order to compel the discharge of a mine foreman who, they allege, has been laying off men for whom he acquired a dislike. The company declares that it will sustain its foreman, James Ferdinand, as he is a trusted and valuable employee. He discharged Mike Lombardo, and Local Union No. 229 met and voted for a strike.

Allegheny Valley Miners Still Striking

The strike in the Allegheny Valley fields for the establishment of the union still continues and may well end in triumph for the miners. It is stated that the McFetridge Coal Co. has been paying the strike breakers 3c. per ton more than the former force of the mine has been demanding, but nevertheless they have not been successful in importing strike breakers. They recently gave up the attempt to work, for the expense of the deputies was too great and the fear of the violence of the men made working without deputies impossible. The strike in the Allegheny Valley, if won, will be gained partly by the terrorism of the union men, partly by the shortage of men and partly by the anxiety of the companies to participate in the profits which are once again after many years to be earned in the coal industry.

Sporadic Strikes in Central Pennsylvania

Central Pennsylvania is not without its troubles. After the Buffalo, Rochester & Pittsburgh interests signed up, there were some employees still dissatisfied and disposed to be violent.

At Lucerne mine, for example, the disorder resulted in 17 men, all Italians, being arrested and lodged in the county jail, June 29. A number of the miners on their way to work were threatened with clubs and revolvers. Buggy-wheel spokes provided with handles seemed the weapons preferred for enforcing the will of the Italians. The men tried to riot in the jail, but without much success.

There is a strike at Finleyville in the Broadtop region of Pennsylvania over the yardage scale of J. M. McIntyre & Co. This was called by the union and has lasted since Apr. 19. The mine of E. Eichelberger & Son, also in the Broadtop region, has been on strike for the same reason for four weeks. At Twin Rocks in Cambria County, not far from Ebensburg, there is a strike of several hundred men, which commenced Mar. 10 and seems likely to continue, evictions not appearing to have daunted the miners.

On June 26 the miners of the Nineveh Coal and Coke Co., at Seward, suspended work, 75 men going on strike. The miners complain that they have received short weight, and they demand that the weighboss be discharged. Superintendent H. G. Dick has refused to comply with their request.

At Hooversville in Somerset County, on the Baltimore & Ohio R.R., Telford Lewis, the operator of the Knickerbocker No. 1 mine has been endeavoring to stop the union men from gathering at the pit mouth and hurling taunts and threats at the nonunion workmen as they entered the mine. To this end he leased the land adjacent to the tipple and posted notices forbidding tresspass. The miners disregarded the signs and 14 union men were arrested, including two state organizers of the United Mine Workers of America, the fines and costs totaling $5.97 in each instance.

Southwest Seeks New Contract

The striking miners in Cherokee and Crawford Counties in the southeastern corner of the State of Kansas returned to work on June 28 as the result of a conference between the representatives of the Southwest Interstate Coal Operators' Association and those of the United Mine Workers. There was therefore nothing from then on to prevent a conference.

On June 30 John P. White came to Kansas City and met the miners' and operators' representatives from Missouri, Kansas, Oklahoma, Arkansas and Texas. The miners hoped that arrangements might be made to give 3c. a ton increase for mine-run coal and a 5 per cent. increase in day and dead work, the leading requirements of the McAlpin contract, which of course does not apply in the Southwest districts unless those districts happen to be willing to confirm it.

Argument of Oklahoma Operators Published

The Oklahoma companies have circulated the following statement of their position in English, Italian and Polish.

To the employees of . . . . . mines:

What's the matter with the coal mines of Oklahoma? They are sick. But what made them sick? No work. And why no work? The cost of making coal has gotten too high as compared with opposition coal. Western Kentucky mines have taken our Arkansas business. District 23 of western Kentucky has signed up for the next two years without an increase. New Mexico and Colorado mines have taken two-thirds of the business in the western half of Oklahoma and Texas. They are nonunion mines and have not increased wages during the past ten years as Oklahoma mines have done. With two increases in wages during the past six years, you have earned less money each year because of reduced running time.

The nonunion mines of Alabama are selling 100,000 tons of coal in south and east Texas that once came from Oklahoma mines. Colorado and New Mexico mines have increased their run at your expense because they are able to undersell Oklahoma coal. When the Rock Island R.R. needs more coal than its Hartshorne mines can produce, it is shipped in from western Kentucky at less than it can be mined for here.

Why should we let either nonunion or union mines take our day's work from us? Why should you be forced to leave your home and family to find work, or to move to nonunion fields and work for lower wages than you are now getting, as many have already done? Because the mines at home do not run enough to support you. Why not help the mines here to run more steadily and work at home? The interest of the company and the men is the same. Any increase in wages now means less running time and more coal companies going broke.

We want you to know the facts. We ask you to consider and investigate this matter and to advise your officers to accept the present wage scale for another two years. This is what has been done by the union miners of District 23, western Kentucky, who are shipping coal into the markets which belong to you and us and increasing their running time.

Higher Wages in Oklahoma Only Mean Less Work

Higher wages mean less work, while more days' work mean bigger pay on pay day. More days' work means more to you than the increase. If we can sell coal cheaper instead of higher, we can increase our market, work the mines more days and give you more money in your envelope. The coal companies of Oklahoma have been losing money. Those that have operated during the past year have not run half time or made expenses. Twelve companies have failed and gone into the hands of receivers.

We need more business. We cannot increase wages any further and stand up against the nonunion mines of Colorado, New Mexico and Alabama and the nonunion lignite mines of Texas. Do you want the mines of Oklahoma to work less and the mines of these nonunion fields to work more? Or do you want the mines of Oklahoma to work more steadily? Increased wages in Oklahoma mean less Oklahoma coal mined. The situation is very serious. These are the facts.

Oklahoma May Withdraw From Association

The Oklahoma operators have been the chief sufferers from competition, and they strongly oppose any concessions as the foregoing notice clearly shows. At a meeting of the coal operators of all four states on Monday, July 10, they decided to act as a unit, the operators all declaring that before any change was made in the present program, which prohibits any increases, any state which did not feel able to permit any advance would be given an opportunity to withdraw from the association. The Oklahoma operators, by publishing in all the daily papers the notice just quoted, hope to convince the miners that their interests lie in maintaining the present scale and not in seeking an advance. They declare they feel the competition of gas and oil and nonunion fields. They state that large industrial consumers are urging them not to increase wages, which are now as high as in any state of the Union. These industrial concerns declare that any advance in prices will cause business to contract.

Kansas is willing to grant the increases, but the Oklahoma operators will only renew the old scale. Oklahoma will probably leave the association in order to wage its fight alone and to the bitter end.

Editorials

Timely Advice to Young Men

Timely advice, it may be, but not exactly moral or patriotic, although it is advice such as one would give to his son if he would have him succeed.

No young man today who would decide on a career should try to enter a staple industry—an industry, that is, that the country cannot readily dispense with, one that renders the public a real service. The public has determined that all these shall be conducted without profit, and when a business is so conducted the office forces will suffer and the capitalist will slowly squander all he has made.

Keep clear of railroads; avoid the coal-mining industry. The electric railroad lines and the light, heat and power companies are new, and in the past they have been, and for a while in the future they may be, successful. But looking further ahead, there is nothing except regulation and penury before them. They have escaped only because their initial charges were large enough and because inventions have continuously made progress possible.

But when the developments in the industry lag so that costs must rise concurrently or in some degree with wage scales, these institutions will be like the others, regulated till they pay the poorest of salaries and have the meagerest of equipment. As a result the time will come when in desperation they will be obliged to offer poor service, even dangerous service, and then the public will add imprisonment and penalization to impoverishment and squalor.

The railroads and the coal mines have reached this stage. Every third-rate editor the country wide is praising the merchant or manufacturer in his home town who is making 100 per cent. per annum, and casting slurs on the coal man who is making 4 per cent. or perhaps less.

Do you want to go into a helpless industry where the daily costs are figured to six places of decimals because they have to be met promptly, but where taxation, depreciation, exhaustion of resources, obsolescence and overhead charges are overlooked of set purpose because they have to be met in any event whether the mines work or not, and because the meeting of some of them can be staved off from one to ten years?

Do you want after years of hard labor to reap only a bad name as an oppressor of the poor—a coal baron? Rather make the equivalent of $45,000,000 of cash and $45,000,000 of stock like Willys in about 10 yr. in the automobile business, and do it with the respect of your fellow citizens. Make money like Ford amid the plaudits of the nation.

No one begrudges the salaries of Madame Gadski, Enrico Caruso, Charlie Chaplin or of the leading ball players. The public is rather proud of its lavishness to them. They have taken the place of the captains of the staple industries in the work of stimulating the public imagination.

When any man becomes rich catering to the comforts, the pleasures or the follies of the people, he is applauded. If he becomes the servitor of their needs, the very prop on which their homes rest, then if he makes even a small percentage of profit, his success is an accusation, and not a merit.

Young man, if you would seek to do well, be careful not to choose an occupation where your industry will advantage the public, for all the profits you make will be regarded as the sordid pennies of the poor.

Old and New Mine Literature

Time was when we believed that mining literature was a description of such things as were used exclusively in coal mines. We shall never know how many years, decades even, we have lost because of that restricted idea.

You know what is meant. The siphon was used in the mine almost exclusively. True, in a small way brewers used it and chemists, and then it had some application in a coffee percolator. But in the mines it had had a truly marvelous development, and so we mining men studied it and humored it and wept over it after all the rest of the world had given it up.

We never would study pumps with the same gusto. Other people used them till they lost their exclusiveness, and then, besides, the study was so grossly commercialized. You couldn't say "pump" without wondering whose pumps, what was the catalog number and what the address of the maker. A mercantile study, therefore, is and was the study of pumps. It is better to discuss the leaky siphon from which no firm can get any glory or coin any money.

Then there was the tromphe, which none of us ever saw, but the profession in a remote past had used it, had borne with it for a while and sorrowed on it, long after everybody else had known that it was a snare and had carefully avoided it. And after we had abandoned it, in the mine it still had a place of honor in our pages on ventilation.

The furnace is another survival. In most books it gets better treatment than the mine fan but, stranger, "'tis a poor thing but mine own," and somehow we cannot tear ourselves from it. You see we carried this wasteful system of securing a draft so much further than anyone else. No other industry was conservative enough to carry it so far, and so we can't help talking about it; pardon our weakness.

Our literature is apt to tell all the details of rope haulage by gravity and engine and leave the other forms sparsely treated. It is apt, by referring only to our peculiar institutions, to save our dignity and to promote our loyalty to our exclusive traditions at the expense of our pocketbooks.

There are other things also, but enough is said. Our modern literature will fail to do what it should if it refuses to tell about things done outside the industry which might be just as well done inside of it. If our mine literature accepts the demand of the people and says nothing about developments in metal mining and other industries bearing on coal mines for fear of being

thought theoretical or otherwise short of the right kind of material, we will make no progress, for we will shut ourselves off from the experience and activity of 96 or more per cent. of the world's population.

Our domain is invaded now and again by men who are not practical from our narrow point of view, but these men, who have seen much the same work as ours conducted far more intelligently in some other producing or manufacturing lines, can show us not a little of value.

Until the coal business looks to the sun and not to its in'ards for light, it will wander around in darkness. One time the best examples of pumps and engines could be found at the mines. The Cornish diggings practically gave the world Watt and Murdock, for without the support of the copper and tin mines these inventors would never have made the mechanical progress they did. Now the manufacturers teach us how to burn our own coal, and the mine no longer has the brightest and best engineers in the country, as was true in England in the early part of the nineteenth century. We are today making no Stevensons. Too often modern practice is forced on us from outside greatly against our will.

We are always looking to solve some new problem in an old way rather than to meet old problems in a new way. The first solution is that of the merely experienced man; the second is the work of the truly practical manager. After all, to be experienced is not necessarily to be practical, though the derivations of the words might be held to prove it.

Proportioning of Mine Timber

In past years many textbooks have stated that a prop or other mine timber should be of as many inches in diameter as it was feet in length, because a stick of that proportioning was as strong in resisting deflection as it was in enduring compression. It was a pretty theory.

Perhaps it is safe to say it never had any considerable hold in this country outside of the anthracite region. There it may have done little harm, but, if so, not because of the excellence of the theory, but because in that district props needed a strength that could be secured only by making them of the diameter suggested or even thicker in the thinner veins. The thickness of the coal has nothing to do with the weight to be supported. It is the thickness of the draw slate which should regulate the burden on the propped area, and props should be expected to give under any larger burden.

In answer to this statement it will be said that by regulating the number of props so that each will be equally strong against deflection or compression an economy will be secured.

That is true if the roof is as strong as a bell and the support can be disposed in the manner suggested. But it frequently is not. If the timbering is to support a foot of rock only, the rest of the coal cover being part of the main monolith, then a timber 8-in. square, which will support 170 tons or, say, 28 tons with a factor of safety of about six, will maintain the loose roof for an area of 342 sq.ft. Thus props 18 ft. apart would fill the requirement, and aided by the viselike hold of the roof on the draw slate, they should provide for the support of an even larger area.

But as every experienced man knows, such propping would be unsafe in the best of roofs. One could, of course, carry the strength over the 342 sq.ft. with heavy beams 18 ft. long and use crossbeams equally heavy from these to protect the roof with a network of timbers. Which would also be extremely foolish.

The only right way in many cases is to pay little attention to the possible loading and to have an adequate prop wherever or nearly wherever it is needed. A few crossbars if necessary will do the rest. But these props placed solely for the rock immediately superincumbent will never fail from the weight of the immediate roof whether by compression or deflection. Fail they surely will when the main roof crowds them, if the bottom does not give way or the caps do not spread or the ends doze, but they will always perform their function of holding up the loose roof immediately above them. With posts 4 in. square set a yard apart, compressively considered each post will sustain about 7 tons with a factor of safety of six. This is equivalent to a thickness of rock of 10 ft.

Clearly then, the importance of most props rests in their being where needed and not so much on their strength. That is why we so often taper props regardless of the harmful effect on their ability to sustain a weight. The rule requiring an inch of diameter to a foot of height is perhaps inadequate where the coal is quite thin, but too generous where it is thick.

It must be recalled, however, that the estimates made here overlook the fact that while we do not wish the props to hold up the main roof, they are disposed to shoulder that burden gratuitously and we cannot well gage how much resistance they are going to make to its movement. If the bottom, the prop and the cap are all alike unyielding, then the prop is broken. The prop takes the burden put on it, not the burden we ask it to sustain.

Thus, in practice, the load is larger than the loose draw rock will account for. Nevertheless the line of reasoning is right that a prop should be valued not so much for its strength as for its handiness to a point of stress. It is interesting to note than the new Coal Miners' Handbook recognizes this fact.

It seems to be true that many props rather than large ones is the main desideratum. Of course as props are apt when delivered to be crooked, sappy and shaken and after use rotted and dozey, it is never well to let a prop 3 ft. long or less be less than 3 in. square in cross-section—4 in. is better—nor is it advisable to let a 6-ft. prop square less than 4x4 in. But if a 10-ft. prop will square 5x5 in., there is no need to have it stronger. It is better to have more props unless the draw slate is heavy. The need for good timber is bringing these facts clearly home to many men.

A little flexure such as a deflective weakness will provide will sometimes save a prop from destruction when the "weight comes on" and thus will make it possible for the prop to bear the burden for which it was designed, which, as stated, is the continued support of the draw slate regardless of the movement of the main roof.

Attention is called to the article "Electrical Distribution and Application in Mines" by H. M. Warren, which appears in this issue. This article is the first of the series on underground mining already referred to many times in these pages. Every mining man who is desirous of keeping abreast of the technical progress in coal production should read these articles without fail.

Department of Human Interest

Dr. Rountree with the Army

Dr. Rountree, who has been for many years chief physician and surgeon of the Tennessee Coal, Iron and Railroad Co., has been called into active service in the army. Dr. Rountree has been a pioneer in the proper care of miners at mine villages. There are no mines in the country where the men are given better medical care and supervision than those of the T. C. I. and R.R. Co., and no companies have better surgical facilities.

Dr. Rountree has, moreover, been a leader in national movements. He was one of the leading men in the American Mine Safety Association, and his interest in the work added immensely to the usefulness and prestige of the institution.

He is a first lieutenant in the medical reserve corps of the United States Army, in which he enlisted two years ago. He spent several weeks at Fort Oglethorpe, Ga., familiarizing himself with the work. Physicians who have been in charge of coal villages and who in that connection have had both medical and sanitary duties to perform are especially fitted for work in the field, where a similar authority falls to the medical officer. Especially is Dr. Rountree fitted for work on the Mexican frontier by his knowledge of the needs of people in the heated climate of Alabama.

He left on Sunday, June 25, for Montgomery, Ala., where he reported to the senior assistant mustering officer of the United States Army, Capt. W. P. Screws. He will be engaged in the conduct of medical examinations in connection with the mustering of the militia into the service of the United States.

Cresson First-Aiders To Meet

Final instructions have been sent to the teams for the Cambria County First-Aid Meet to be held at Cresson, Saturday, July 22. The entries for the meet are as follows:

Maryland Coal Co., 1; Binder Coal Mining Co., 1; Eastern Bituminous Coal Mining Co., 1; Sterling Coal Co., 2; South Fork Coal Mining Co., 1; Madeira-Hill Coal Mining Co., 1; Riverside Coal Mining Co., 1; Commercial Coal Mining Co., 3; Pennsylvania Coal and Coke Corporation, 12; Watkins Coal Co., 2; Steinman interests, 1; Rembrandt Peale interests, 3; Rich Hill Coal Co., 6; Vinton Colliery Co., 1; Empire Coal Co., 1; Clearfield Bituminous Coal Corporation, 1; Shoemaker Coal Co., 1; Nant-Y-Glo Coal Mining Co., 1; Barnes & Tucker, 1.

Thus 41 teams are expected, and this guarantees that the meet will be one of the largest ever held in the bituminous field of Pennsylvania. The National Safety Council will present its first-aid medals to the winning team. There is a special medal for the patient. The American Red Cross will award medals to the winning team and certificates to the second and third teams. Their certificates will also go to the winners in the one-man and two-man events.

The contest will be held at the Pennsylvania Railroad Co. Athletic Park provided the weather is fair. In case of rain the Rev. Father Graven has offered the use of the pavilion at Maplewood Park. The contests will begin at 10 a.m. and, after dinner, will be resumed at 1 p.m. At the close of the meet H. M. Wilson, formerly director of the United States Bureau of Mines at Pittsburgh, now with the Associated Companies, will deliver the address. The meet is to be held under the direction of the Industrial Committee of the State Young Men's Christian Association, Harrisburg, George B. Landis, secretary, with the coöperation of the Bureau of Mines and the American Red Cross.

Susquehanna Safety Methods

Among the means adopted by the Susquehanna Coal Co. to promote safety at their collieries are two shown herewith.

Fig. 1 shows guards used at the No. 2 Lykens breaker to protect operatives should a rope break.

Fig. 2, shows how, by means of a large safety truck, the sinkers at the Lykens shaft are protected from loose rock falling from the bucket. The topman is also

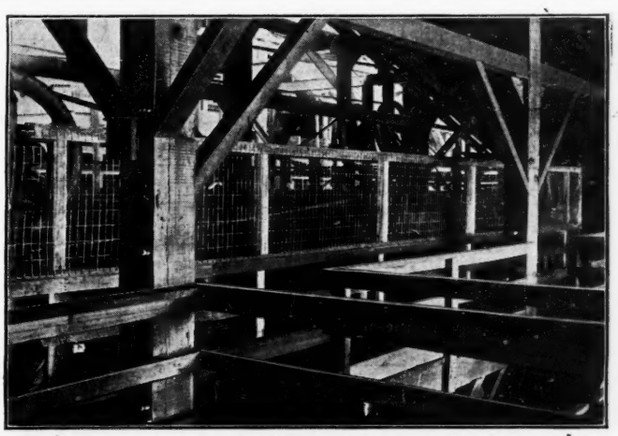


FIG. 1. GUARDS FOR TRANSMISSION ROPE

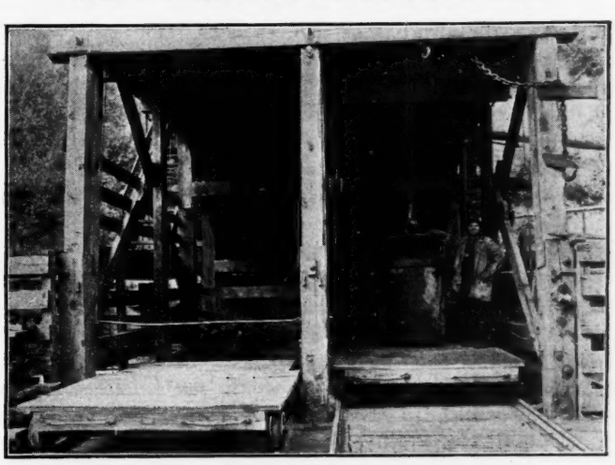


FIG. 2. SAFETY TRUCK IN SHAFT SINKING

prevented by the same means from falling down the shaft when the bucket is being disengaged. The truck is exceptionally wide so that when rolled over the opening it entirely covers it. This picture was taken during the sinking of the shaft Oct. 14, 1914.

The Lehigh Coal and Navigation Co., through S. D. Warriner, the president, has announced that men who enlist in the United States Army under the recent call from the Government will be able to obtain their old position or work of a similar nature paying an equal salary, if they apply for their reinstatement within 30 days from their discharge from the United States service. The company will assist all men who have left dependent families for army service by a contribution of $25 per month to be continued as long as the men remain in the service of the United States Army.

Discussion by Readers

Mining Thin Coal Seams

Letter No. 2—In attempting to reply to the query of "Superintendent" on the subject of "Mining Thin Coal Seams," one faces the difficulty of not having the full information that is needed to make his reply of positive value. However, there are here presented some interesting problems that are well worth discussion.

Personally, from a considerable experience in the working of thin coal I would advocate the adoption of the longwall method of mining, recognizing only that there are two limits that must always be considered in longwall work; namely, bad roof and the kind of labor employed. If the class of labor available is composed of miners accustomed to the room-and-pillar system of mining, it would be well to consider the advisability of adopting some modification of that system with which the men are familiar before deciding to adopt the longwall system, which requires experienced longwall miners to insure success.

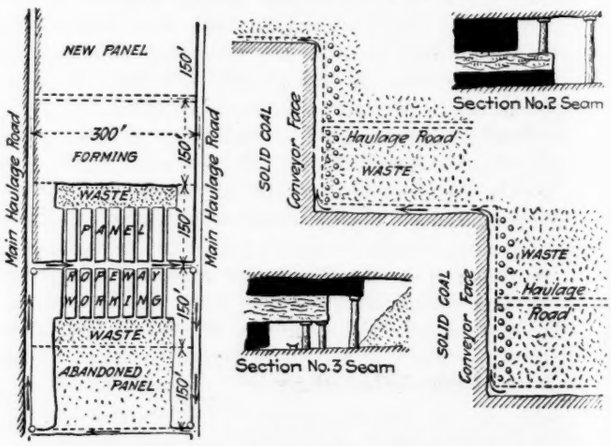
I recall a sad experience of my own along this line in attempting to change the system of operation from single entry to longwall, in an 18-in. coal seam having a moderately difficult roof. The miners in that district were opposed to the change and could not be induced to learn anything new, which resulted in the absolute failure of the new scheme. It may be that a modification of the room-and-pillar system, such as that described in the same issue of *Coal Age* in which this inquiry appeared, page 1044, could be applied successfully. In answer to the three propositions presented, let me suggest the following:

Seam No. 1—Owing to the "very bad roof," it is possible that the longwall system could not be used with success in working this seam, and it would be safer, perhaps, to adopt a modified room-and-pillar system. There are instances where 18- and 20-in. coals have been worked by the pillar system in the same manner as thicker seams, except that rock had to be taken down to give sufficient height in the rooms. In the working of this 3½-ft. seam, however, it would not be necessary to take down rock in the rooms, and the main difficulty would be the possibility of having to pay an extra price for tramming the coal from the faces of the rooms to the entry. But it is possible to avoid even this difficulty by adopting a suitable system of locomotive haulage, although that may be impracticable if it would necessitate the remodeling of the surface plant.

In this connection, I want to refer briefly to a panel method that was employed in working a coal seam of the same thickness as this one. The size of the panel was 300x300 ft., and the work was so arranged that one panel was always being worked while the rooms were forming in a second, and a third panel was nearing completion, while in still a fourth panel the pillars were being drawn in readiness to abandon that section.

In applying this method in the present instance, I would suggest splitting each panel by a haulage road or ropeway, as shown in the figure. Owing to the bad roof, narrow stalls should be driven up each way from the center, and the coal worked out on the retreating system, as indicated in the middle one of the three panels shown in the figure. The engine or motor used for driving the rope is frequently located in the abandoned panel. The rope passes over the four sheaves and has the direction shown by the arrows.

This system of endless-rope haulage was designed to reduce the distance of hand tramming in each panel. It was a side-rope haul and the cars were hooked onto the rope by the men, who took off their own empties as required. Some empties when not taken off would continue to run around and were again hooked to the rope and returned. As soon as a section was finished, the sheaves at the corners of that panel were moved ahead to the next panel, and an additional splice of rope was



PANEL AND LONGWALL METHODS APPLIED TO WORKING OF THIN SEAMS

added. This system can only be used in level seams, but it has the advantage of providing an easy and cheap method of tramming at the working face, while it avoids the necessity of brushing the roof on these roads. Some skill and ingenuity is required in setting the sheaves at the corners of a panel in order to avoid the derailment of a car and a consequent wreck.

Seam No. 2—The conditions presented here seem ideal for longwall work and I would advocate that system being employed, provided the coal is overlaid with a fair roof. I have worked in similar seams where the coal was mined longwall. The mining was done in the upper coal, just on top of the stone parting. The top coal was then taken down and loaded out, after which the stone parting was lifted and thrown back in the waste or used for building the packwalls, for which it was admirably adapted. After removing the stone, the bottom coal was taken out. Much will depend on the relative amount of stone and bottom coal, and the quality of the latter.

In the case to which I refer, the maximum thickness of stone lifted was 20 in., while the average thickness was about 15 in., for the same amount of bottom coal.

When the thickness of the stone exceeded this proportion, the bottom coal was left unmined. In these days of machine mining, the cut can probably be made by the machine in the shale parting, just under the upper coal, as I have indicated in the small section of this seam shown in the figure; but when mining by hand it was necessary to put this cutting in the coal seam.

In the same figure is shown a plan of longwall in which the face is advanced in steps. This plan is particularly adapted to the working of thin seams, because it provides a straight line of working face for the operation of the belt conveyor. As shown in the figure, each conveyor face is reached by a single haulage road at the middle of the face, fed by two conveyors. The use of a longwall conveyor face, which has been successfully employed in such cases, will obviate the necessity for the endless rope system of tramming I have described.

Seam No. 3—In my opinion, this is the worst of the three cases considered, owing to the great thickness of the hard shale parting, which exceeds even that of the lower coal. I would adopt here the longwall system of mining, as before, and use machines to undercut the lower coal, taking this out first before dropping the stone and the upper coal. Much will depend upon the freedom with which the stone parts from these coals. Instead of attempting to maintain roads through the waste, I would adopt the face conveyor, shown in the figure, for transporting the coal along the face to the main road in each section. The upper coal being only 14 in. thick, the question of taking it out or leaving it unmined will depend on the cost of handling the stone parting and separating it from the coal. It may happen that the cost of breaking down and removing the stone will outweigh the value of the upper coal, in which case the mining of that coal must be abandoned. MINING ENGINEER.

Sydney, N. S., Canada.

Use of Belt Dressing

Letter No. 1—My attention has been drawn to the short article entitled "Attacks Use of Belt Dressing," *Coal Age*, June 3, p. 966. Putting it mildly, it is a matter of considerable surprise to me that any practical man could write such an unpractical article.

In reading the article one is convinced that its author is either a man of no experience, and therefore incapable of giving views of any value on belting and its treatment, or his experience has been with materials that are not worthy of the name "belt dressing." His remarks imply that all belt dressings contain rosin, which any intelligent man knows is not the truth. A dressing containing rosin is unfit for use on a belt, as the rosin acts as a drier, causing the belt to deteriorate rapidly.

The writer of the article shows that he does not know how to apply belt dressing, good or bad. He speaks of putting on the dressing "with a stick"—a method as obsolete as the product he seems to have in mind. He says this way of applying the dressing is very dangerous, but what seems strange is that any sane man would think of using such a method. With equal wisdom, the writer might have suggested the danger of placing one's head on a railroad track when a train is approaching.

The article further describes as "an ideal drive" a condition when the pulleys are clean and the surfaces of the belts have become polished through operation. Any practical man knows that the polishing of the belt and pulleys shows an undue amount of slipping of the belt. No doubt the same writer would suggest the use of tight belts to overcome slipping by increasing the friction, thereby straining the belt and requiring more power to drive the system.

Again, he speaks of dressing on a belt "picking up dirt and dust," with the many attendant evils. No doubt this would be true with rosin dressings, but it never occurs when a proper amount of good dressing is applied to a belt. This amount should not exceed an eighth of an ounce for a 4- or 5-in. belt when the pulleys are from 15 to 20 ft. between centers. The dressing must properly penetrate the belt, instead of smearing the surface as is the case with the combination of rosin and grease referred to in the article mentioned. It is unnecessary to comment on the writer's reference to the rosin sticking the belt to the pulley and stripping off its paper covering, as no experienced superintendent would permit such a dressing to be used under those circumstances.

Finally, to clinch his argument, the writer of the article states that "no belting firm of standing will recommend belt dressing of any kind, with the solitary exception of a little light oil to keep the belt soft and pliable under special local conditions." I would add, Neither do you hear of quack physicians who advertise to cure chronic diseases interesting themselves in the enactment of laws that would close the dives or that would tend to prevent the spread of disease and cut off their practice.

Convinced of Utility of Belt Dressing

The following incident may be of interest to our friend who so ruthlessly condemns the use of a belt dressing: A sales manager of a large belt-manufacturing establishment was led to apply for a position with a reputable belt-dressing manufacturer through the reports of his representatives and customers in regard to the satisfactory results obtained by the use of a certain brand of belt dressing. The investigation of these reports convinced this man that the dressing was possessed of wonderful life-giving qualities, cleansing the belt and giving greater efficiency in the transmission of power. He realized that these qualities are of great value to the user of belts. Upon assuming his position with the manufacturer of belt dressing, the former sales manager stated that it was the policy of the belt manufacturers to discourage belt dressing, good or bad, because those dressings prolonged the belt's life and reduced the belt manufacturers' volume of business.

My own experience confirms the foregoing statement. While I would not use either rosin or a rosin dressing on a belt under any conditions because of its disastrous effects, I know there are on the market several brands of belt dressing that can be used with profit. The application of such a belt dressing stops the slipping of the belt and increases the power transmitted, thereby giving the full efficiency in belt transmission and at the same time increasing the life of the belt. It is well known that the least slip of a belt burns and hardens it. The brand I have been using waterproofs the belt and is of special value in exposed places where the belt is subjected to dripping water.

Loyalhanna, Penn. T. G. EVANS.

The Anthracite 8-hr. Agreement

Letter No. 1—In replying to the question, "What Does the Miner Want?" *Coal Age,* May 20, p. 884, allow me, first, to classify the miners of the anthracite region in the following three groups: (1) The general contractor who contracts to drive tunnels, gangways, airways, in fact any narrowwork, at a specified price per yard. (2) The common miner engaged in driving a room or chamber on a tonnage basis. (3) Company hands or daymen, and the miners employed by a contractor at an agreed compensation. The conditions under which these different classes of labor are employed vary greatly and must be carefully considered before we can answer the foregoing question. Let us refer briefly to these conditions:

The general contractor of narrowwork is the biggest factor in the situation. He puts in a bid to do this work for any large reliable company, at a stipulated figure to be paid him from time to time as the work performed by his men is completed and measured up. He hires, pays and discharges his own men, for whose work he is responsible.

It has been remarked that this man never has to work himself, but I have yet to see a contract miner who fails to work as hard or harder to get his coal and rock cut than the men whom he employs. There may be a few exceptions to this rule, but it must be remembered that the contractor takes many chances regarding the nature of the strata and the faults and other irregularities of the seam. If his bid is too low to meet these conditions, he faces a monetary loss. However, the day of big contracts is passing in the anthracite region, since much of the solid coal has already been mined.

Speaking of contract mining, there is a kind of contractor that should never have been allowed to exist. I refer to the man who takes a contract to mine and load coal at a stipulated price per car, agreeing to assume all the responsibility of ventilating and draining the mine and hauling the coal, besides paying his own men. In my opinion, this man is too often a "leech," sucking the life blood of the men who work for him.

For example, he will bid on a certain vein of coal at, say, $3 per car delivered on the tipple. He then hires his miners and laborers, agreeing to pay the miner $3 and the laborer $2.50 for every six cars of coal they mine and load, besides supplying the necessary tools and powder for the work. It is easy to see that, allowing the cost of powder is $1 per car of coal loaded and assuming the contractor employs 100 miners and as many laborers, who put out 600 cars of coal per day, the entire expense of ventilating, draining and timbering the mine and hauling the coal will not total 50c. per car of coal loaded. On this basis, the contractor would net a profit of between $500 and $600 a day on his contract. I am glad to say that this type of contractor is rapidly becoming extinct in anthracite mining. Certainly, he justifies the poem entitled "The Contract Miner," that appeared in the article to which I have referred.

Now, glance for a moment at the conditions surrounding the work of the common miner, who constitutes the second class mentioned above. I have seen this man under every possible condition in the mine and regard him as the most downtrodden of all mine workers, for whom I would gladly hold a brief. Certainly, the writer of the poem just mentioned never saw this man at work, much less has he ever performed such work himself, or he could not have applied the lines of his verse to any of that class of mine workers. Neither do I consider that these miserable lines apply truthfully to the general contractor represented by the first class.

Speaking of "strikes," I have been through four of them, and have yet to see a miner hug himself with glee, as described in the poem. Instead, most of the men have developed a few more careworn wrinkles in those weary weeks of idleness. I want to ask, Why should a miner be compelled to remain in the mine 8 hr. when he is able to complete his day's work in from 4 to 6 hr.? Why should he be shut in from the enjoyment of God's health-giving sunshine and be compelled to remain in the dark chambers of the mine, encased in damp clothes and breathing foul air that too often develops miners' asthma and other complaints?

The third and last group of miners I have mentioned are the company men, dayhands and contract miners who are paid for so many hours of labor. These are the men who benefit largely by the 8-hr. agreement. They are under no expense for tools or powder and, in a few instances only, supply their own oil. Permit me to say in closing there is no excuse for compelling the miner to remain underground after his coal is mined and his place properly timbered and made safe for the coal to be loaded.

THOMAS A. EVANS.

Plymouth, Penn.

Letter No. 2—I have just read the article entitled "What Does the Miner Want?" *Coal Age,* May 20, p. 884, having reference to the difficulties encountered in the practical operation of the 8-hr. agreement recently signed by the operators and miners in the anthracite region. Reference is made to strikes growing out of this agreement. I wish to state that these strikes should not be placed to the credit of the contract miner, as the article strongly implies.

Anyone familiar with the varied conditions of coal mining knows that the 8-hr. agreement affects different classes of mine employees in a different manner. While it helps the drivers, runners and company hands by limiting their working day to 8 hr., it imposes an unjust burden on the miner, who is compelled to remain in idleness a part of the 8 hr., when his work can often be completed in from 4 to 6 hr. Notwithstanding these hardships imposed on them, the miners are not the ones who are dissatisfied with the agreement entered into by their leaders. Neither can the responsibility for strikes be laid upon the United Mine Workers of America. The strikes, in this instance, are caused by the class of company men to which I have referred, notwithstanding the fact that they derive the greatest benefit from the agreement. Scarcely 10 per cent. of these men belong to the union; they constitute for the most part what are known as "open-shop workers." The contract miner is willing to abide by the new agreement; he is loyal to his union and is respected by the operator.

The cause of dissatisfaction on the part of drivers and certain other company hands is the contention of the coal operators that these employees must be on hand and ready to start work on the inside of the mine at the appointed hour for work to commence. To do this the driver must enter the mine at an early hour, in order

to clean his mule and drive him to the point inside of the mine where the work starts. The distance to be traveled is sometimes shorter and sometimes longer, varying in different mines. I have seen manways that must be traveled by the drivers a distance of 2 mi. before they reach their work. In order to be on hand and ready for work on the inside of the mine, in such cases, it is necessary for a driver to go into the mine at 5:30 o'clock every morning when work starts at 7 a.m.

Again, in addition to the hour or hour and a half of extra work in the morning, the driver must add another hour at the close of the day, making it 4 or 4:30 p.m. before he can leave the mine. The company's rules also forbid drivers running their mules at a rapid pace through the manways. Anyone familiar with these conditions will recognize the inequalities of the new agreement, as it affects different classes of mine workers.

In the article referred to, the statement is made, "The anthracite miner does not want to work 8 hr." I must say this is not true. Investigation will show that the ambitious miner is generally found in his chamber at 6:30 o'clock every morning; he is always there at 7 o'clock. Many a miner works until 3 p.m., unless, owing to a scarcity of cars or other cause, he must wait in idleness or he has mined coal sufficient to load out his full turn.

Conditions are not often such that a miner can complete his day's work in 4 hr. as men know who have worked coal on a pitch of 30 to 40 deg., cutting coal and setting timber to keep the place safe; or even performed the same work in a moderately flat seam, except under particularly favorable conditions.

The miner is a hard worker; he makes few trips to Europe, as charged in the article to which I have referred. He obeys all rules, whether they be the "Roderick rule" or those laid down by his mine foreman. A visit to an anthracite mine will prove that a strict account is kept by the peg-boy stationed at the entrance, of the coming and going of each worker, be he miner or laborer. It is hardly worth while to say that the verses on "The Contract Miner," at the close of the article mentioned, in any sense describe the anthracite miner, who is an industrious, hard-working, honest man.

Plymouth, Penn. FRED B. HICKS.

Letter No. 3—I was deeply interested in reading the references in *Coal Age,* May 27, p. 920, in respect to the difficulties arising in the practical application of the 8-hr. agreement made between the operators and miners of the anthracite region.

The statement is made that "The Delaware, Lackawanna & Western Railroad Co., Coal Department, appears to have men who loyally abide by their agreement whatever they may think of its provisions." I do not believe what this statement would seem to imply—that the Lackawanna Coal Co.'s men are more loyal than those working for other large companies in the Valley. In my opinion, the difference observed in respect to the Lackawanna men is to be attributed to the fact that the management are more up to date and able to meet the new conditions imposed by the agreement in a satisfactory way.

The Lackawanna management recognized that difficulties would arise in the practical working of the 8-hr. agreement after it was signed by the operators and the miners' leaders. It was clear to them that some employees would be obliged to work more than the specified 8 hr., by reason of the nature of their occupation. It is no wonder, therefore, that in many instances the lack of proper arrangement has been the cause of serious trouble at mines where the want of uptodate equipment has imposed an extra burden on certain classes of labor, and suitable provision has not been made to have the basis of employment equitable.

There are certain features in mining law and mining practice that are in absolute conflict with the new agreement: For example, the Pennsylvania mine law provides (General Rule 17) that whenever five persons arrive at the foot of a shaft or slope, they shall be given an empty car or cage and hoisted to the surface. The provision of this statute would seem to be in conflict with the agreement that men shall work the full 8 hr. in any one shift. Again, where a miner works on yardage, he is often able to complete his day's work in from 4 to 6 hr. and it is evidently not justice to compel him to remain in the mine the full 8 hr. specified in the agreement. Under these conditions, a miner is apt to feel that the much talked of "Golden Rule" has not been considered in the terms of the contract. I want to say that if mine managements would deal with their men after the spirit of the Golden Rule, it would result in a larger yearly dividend, by avoiding those troubles and difficulties that are bound to arise where a cast-iron contract is made to govern the entire operation of the mine.

I am happy to say that, during the thirty-two years that I have worked for the Lackawanna Co. and have seen managements come and go, there was never anything that impressed me as strongly as the simple act of the new manager, who the other day sat down and ate his lunch from an old brown paper, without seeming to think that he was doing anything out of the ordinary. It is such simple acts as these that draw men to a higher official, making them think "He is one of us." With such thoughts running in my head, I sat down and wrote these few lines. I want to say, in closing, there are many things that must be straightened out in a way that no iron-bound contract can straighten them. Nothing but common justice and the application of the Golden Rule will suffice. W. A. B.

Nanticoke, Penn.

Steam vs. Compressed-Air Line

Letter No. 1—Kindly permit me to refer to the inquiry that was answered in *Coal Age,* June 10, p. 1027, relating to certain advantages that the compressed-air line there suggested would have over a steam line in the transmission of power, a considerable distance to points where it is to be used.

It is, of course, true that local conditions in many instances completely control the method to be adopted and it is not always safe to make statements in this regard without a complete knowledge of the facts governing the situation. However, it would appear that in this particular case electricity should have been employed, instead of either compressed air or steam. I am led to offer these few remarks at the invitation that this question be further discussed.

While admitting freely that the use of a compressed-air line would prove far preferable to that of a steam line, in

the case under consideration, in respect to line loss and the other items mentioned, I feel that it is only right to draw attention to the particular advantages that would be derived in this case by the use of electricity, which seems admirably adapted to the conditions outlined in the inquiry. When considered from the standpoint of the cost of production and transmission of power over considerable distances to different points, both the steam line and the compressed-air line make a poor comparison with an electric installation, in respect to the results that can be accomplished by the use of these different means. My experience leads me to conclude that it would pay to use electricity here in preference to either compressed air or steam.

There is no doubt that hoisting engines will operate satisfactorily with compressed air in place of steam and, under certain conditions, their operation by air may prove a financial success. It must be admitted, however, that electric power can be produced and transmitted over long distances at a less cost than either steam or compressed air. It is true, also, that in the use of compressed air, a great deal more steam will be required to compress the air necessary either to operate the same engines with steam or to operate electric hoists of the same power. In my opinion, everything concerned in this problem would favor the use of electricity. J. P. STONE.

Franklin, N. J.

Accounting of Machine Coal

Letter No. 1—Kindly permit me to explain the method used at the mine where I am employed, for keeping account of the coal cut by different machines when miners are transferred from one place to another. It is as follows:

The miners are given check numbers, starting 1, 2, 3, etc., and continuing in regular order, and these numbers are placed at the head of consecutive columns on the weighsheet, to assist ready reference when weighing coal. At the beginning of each pay, the miners loading coal cut by machine No. 1 are given the first set of numbers, say from 1 to 18, inclusive. The weighmaster then draws a heavy line with a red pencil up and down the weighsheet between Nos. 18 and 19 and marks this section of the weighsheet as No. 1, drawing a red circle around this number. In the same manner, the next series of numbers, say 19-36, inclusive, are given to miners loading coal for machine No. 2, and this section on the weighsheet is marked No. 2, with a red circle around the number. The same system is used for all of the twelve machines cutting coal in our mines. However, since one of these machines works double-shift, there are thirteen numbers for the twelve machines.

It is readily seen that in this system the machines are given consecutive numbers, 1 to 13, which are arranged in regular order on the weighsheet, and at the beginning of each pay the miners loading coal for each machine are given corresponding check numbers in regular order as taken from the weighsheet. Now, if a miner is transferred between pays, from one machine to another, he notifies the weighmaster of the change by marking the new machine number on a piece of paper, which he hangs under his check on the first car loaded for the new machine. In that case, the weighmaster transfers the miner's check number to the machine indicated on the paper, placing this number in the proper section on the weighsheet. The miner thus continues to use his old check number until the next pay, when a new number is given to him corresponding to the section in which he is loading coal. By this means, the regular order of the machine numbers and the miner's check numbers is preserved on the weighsheet.

It sometimes happens that one or both men running a machine quit between pays, or one or both runners are idle for a day or so, and new men take their places. In such cases, the men often make a verbal agreement between themselves and divide the pay in proportion to the work performed by each man. When such mutual agreement is made, there is no change required on the weighsheet. In case no such agreement is made between the men, however, the weighmaster divides the coal in the machine-runner's column by a red pencil mark at the point where the change was made and the bookkeeper then proportions the coal cut by that machine, giving to each runner his share of the pay, according to the time worked. In longwall work the pay is estimated by the number of yards cut; or, with a breast machine, the basis of pay is the number of runs made and, in the absence of any agreement otherwise, the tonnage is proportioned to the number of yards cut or the runs made by each man.

It is our custom to credit each loader's tonnage in even hundredweight, noting any overweight at the foot of the column, and these overweights are finally summed up and the total added to the man's tonnage for that pay. The machine-runner's tonnage is the sum total of coal loaded by the miners in his section. W. H. LUXTON.

Linton, Ind.

Letter No. 2—I was interested in the inquiry of "Consulting Engineer," *Coal Age*, June 17, p. 1067, asking for a plan whereby the coal cut by each machine can be properly credited together with the miner's coal, without excessive changes in bookkeeping. Allow me to suggest the following method:

As stated in the reply to this inquiry on the same page, it seems to me that the simplest plan to adopt is to give each machine runner a letter, as A, B, C, etc., and place these letters at the top of the weighsheet, thereby dividing it into as many sections. Each section must contain at least as many columns as there are miners loading coal in that section. Now, write each miner's check number at the head of a column in the section in which he is located. When a miner starts to load coal in any section in which he is placed or to which he may be transferred, he must place the machine-runner's check marked with his letter, together with his own check, on each car loaded for that day or until the weighboss is informed where the miner works. From that time all the coal sent out on that check number would be credited to the same machine runner until the miner is transferred to another section, when he must again hang the machine-runner's check for the new section on his car, together with his own check for the first day or so.

In this plan every machine runner is given a permanent letter and every loader a permanent check number. It is then a simple matter for the weighboss or bookkeeper to carry the footing of each loader's column to the proper runner's column and thus credit him with the coal he has cut.

New Straitsville, Ohio. GEORGE N. LANTZ.

Inquiries of General Interest

Utilizing the Sulphur in Coal

In mining our coal we encounter a considerable quantity of sulphur bands in the form of pyrites, familiarly known as "coal brasses." I have been in correspondence with numerous persons, seeking information in respect to the economic value of this product that occurs as an impurity in the coal, but which I understand has been often utilized by coal companies who have sold this product of their mine to plants engaged in the manufacture of sulphuric acid.

In order to increase the quality of the coal shipped, it is necessary to separate the pyrites, which entails a considerable expense in preparing the coal for market, and to offset this extra expense of production we are desirous of realizing any value that the pyrites may have on the market. In our mines the sulphur band contains chunks or balls of pyrites to which the coal adheres strongly, and it is necessary to crush this material in order to separate the sulphur from the coal. I would like to ask if there is any method by which this separation can be effected more completely and with greater economy than by hand, which is a slow and tedious process.

There is to my knowledge but one coal-mining company that has attempted to separate these coal brasses from the coal and prepare them for market. I understand that the Stearns Coal and Lumber Co., Stearns, Ky., has done this, and would be glad to know of other parties who have attempted the same thing and learn with what success. Can you refer me to any literature on this subject? I have corresponded with the Virginia-Carolina Co., the Grasselli Chemical Co., and Du Pont de Nemours & Co., manufacturers of sulphuric acid, but with little success. If you can throw any light on this matter, it will be greatly appreciated by many readers of *Coal Age*, who have to contend with the same trouble.

Williamson, W. Va. N. H. MANNAKEE.

Sulphur bands and pyrites in different forms are of frequent occurrence in coal seams in different localities, and the separation of this impurity from the coal is often a perplexing question. There results either a large loss of coal that is unfit for market, or the cost of production is greatly increased when it becomes necessary to attempt this separation in order to improve the quality of the coal shipped.

Pyrites has a commercial value only where there is a demand for its use in the market. This has occurred frequently in the manufacture of sulphuric acid, the sulphur for that purpose being chiefly obtained from pyrites. The ore is burned in a furnace to drive off the sulphur, which is oxidized in the presence of water, forming sulphuric acid (H_2SO_4). Pyrites occurs in such large quantities in many localities where it can be obtained in a fairly pure state and at a low cost for transportation to market that the actual value of this product in coal seams depends wholly on the local demand, together with the cost of production.

The occurrence of large quantities of pyrites in the mining of a seam in proximity to a plant where sulphuric acid is manufactured will undoubtedly give the product an economic value. On the other hand, the occurrence of sulphur bands, or pyrites in a finely disseminated form in the coal cannot be considered to have any particular market value. When the pyrites occurs in a crystallized form in large nodules that are easily separated from the crushed coal, the value of the product will then depend on the market demand and cost of transportation of the ore from the mine to the plant where it is to be used. Pyrites in the crystalline form contains about 53 per cent. of sulphur. Pyrite containing not less than 44 per cent. of sulphur has, at times, had a market value of 9c. per unit, or 9c. for each per cent. of sulphur content per ton of ore. The presence of arsenic renders the product valueless, however, owing to the difficulty of separating this constituent from the sulphur.

The simplest and most effective, as well as most economical, method of separating pyrites from coal in mining is by crushing and washing that portion of the coal containing the sulphur. As far as practicable, the sulphur band should be separated from the coal and loaded out by itself. This material is then crushed and sent to the washery, where the fine coal is more or less completely separated from the heavier particles containing sulphur, by reason of its lesser density. Any other method of effecting the separation of this impurity from the coal will generally prove expensive and impracticable.

Several years ago the Amalgamated Copper Co., operating at Belt, Mont., and mining a coal containing 3 per cent. of sulphur, which occurred in the form of nodules of pyrite, attempted the separation of the sulphur in two jigs having a total capacity of 20 tons in 8 hr. The product of the jigs was shipped for a time to a smeltery at Great Falls. The process, however, was soon abandoned as being of no value.

Another instance of the separation of pyrite from coal in mining and disposal of the product to a chemical company for the manufacture of sulphuric acid is found in the description of coal stripping at Danville, Ill., *Coal Age*, Vol. 9, p. 451. The coal was that of the No. 7 seam in Illinois and, according to the analysis of Prof. F. W. Parr, given on page 449 of the same issue, contains 3.37 per cent. of sulphur. In this case, however, the money derived from the sale of the pyrite to the Chemical Co. was divided among the miners as an incentive for them to remove the sulphur from the coal in mining, which greatly improved the quality of the coal. Other similar instances could be given, but the separation of pyrite in the mining of coal must generally be considered simply as being of no particular value further than improving the quality of the coal mined.

In this connection, it is of interest to note that the total production of pyrite in the United States, in 1914, was 336,662 long tons, having a value of $1,283,346, or an average of $3.81 per long ton, Mineral Resources of the U. S., 1914, p. 141.

Examination Questions

Pennsylvania Bituminous Mine Foremen's Examination April 11-13, 1916

(Selected Questions)

Ques.—How would you endeavor to reduce the number of accidents resulting from the movement and handling of cars and motors in mines?

Ans.—In order to reduce the number of accidents from the movement and handling of cars it is necessary to know the causes that make such accidents possible. The principal causes are: Poor equipment; improper system of haulage or arrangement of tracks; inadequate rules regulating the movement and handling of cars; failure to provide separate travelingways or shelter holes on haulage roads; disregard of safety in an endeavor to increase output; carelessness or ignorance and disregard of rules by employees; and, finally, improper loading or overloading of cars.

In avoiding these causes of accident, careful attention must be given to the upkeep of haulage roads and rolling stock and the daily inspection of rope-haulage systems. The system of haulage employed in a mine must be suited to the particular conditions that prevail in respect to the grades of roads and the output of coal required. Single-track entries should not be used on main haulage roads where conditions require a double-track system. Where two or more drivers are working on the same parting, in the gathering haul, they should work together, following each other in and out, in order to avoid any chance of collision. Doors should never be placed at the foot of a grade and no reliance should be placed by drivers on the proper working of automatic doors, but all cars and trips should be under absolute control at such points. Simple rules should be made and strictly enforced in regard to the handling of cars at the head of all inclines and on partings, where they should be securely blocked or suitable automatic derailing switches employed.

No one should be permitted to ride on loaded cars or trips or on a locomotive, except the motorman and his runner. Employees should not be permitted to travel main haulage roads where a separate travelingway is provided. When it is impracticable to provide such travelingway, shelter holes should be made at uniform distances apart on the same side of the haulage road and kept whitewashed and free of all obstructions. Such haulage roads must maintain at least 2 ft. of clearance space on the same side of the road. The timbering of all haulage roads must be inspected daily and all bad timber renewed and any loose pieces of slate taken down or made secure.

In the endeavor to increase the daily output of a mine, due regard must be had for safety in making up trips, coupling cars and in all haulage arrangements. Carelessness on the part of employees, whether causing injury or not, should be punished in order to maintain proper discipline. There should be no excuse for ignorance of the rules relating to safety on the part of any employee, and a disregard of these rules should be properly punished. Suitable danger signals should be placed at conspicuous points where there is danger in the mine, and a copy of the mine rules and regulations should be posted at all entrances to the mine.

Ques.—What is the area and perimeter of an airway that is 8 ft. wide at the top, 13 ft. wide at the bottom, and 6 ft. high?

Ans.—The sectional area of this airway is $\frac{1}{2}(8 + 13)6 = 63$ sq.ft. To find the perimeter, it is first necessary to calculate the length of one side, which is

$$\sqrt{[\tfrac{1}{2}(13 - 8)]^2 + 6^2} = \sqrt{2.5^2 + 6^2} = 6.5 \text{ ft.}$$

The perimeter of this airway is then $2 \times 6.5 + 8 + 13 = 34$ ft.

Ques.—How would you render first-aid treatment to a workman suffering from shock due to an accident?

Ans.—Remove the sufferer promptly to fresh air, taking care to keep him warm while so doing. Send at once for a physician, and, in the meantime, having placed the man on his back with his head low, so that the blood will flow readily to the brain, stimulate the blood action by rubbing and chafing the hands and limbs. If the patient is able to swallow, stimulants should be given, such as hot coffee or tea, or half a teaspoonful of aromatic spirits of ammonia in a half-glass of water. If whisky is given, not more than one drink should be permitted, as a greater quantity may cause depression. Apply smelling salts or ammonia to the nostrils. Remove no clothing, but keep the sufferer warm with blankets or other garments. Hot-water bottles or hot bricks placed against the person and the application of hot flannels to the chest and abdomen greatly assist in inducing heat and relieving the effects of the shock.

Ques.—What is the capacity per minute of a pump 12 in. in diameter, running at a piston speed of 100 ft. per min., allowing 15 per cent. for leakage?

Ans.—The sectional area of the pump cylinder is $0.7854 \times 12^2 = 113.1$ sq.in. The piston displacement is then $113.1 \times 100 \times 12 \div 231 = 587.5$ gal. per min. Then allowing 15 per cent. for leakage, the water pumped is $100 - 15 = 85$ per cent. of the piston displacement, or $0.85 \times 587.5 = 499+$, say 500 gal. per min.

Ques.—Under what conditions does a gas-pipe line on the surface become a menace to life inside the mines?

Ans.—A pipe line for gas, when laid in the ground above the mine workings, is a source of danger whenever those workings lie at a shallow depth below the surface, or the overlying strata break to the surface as the coal is taken out and the underground workings are extended; or when faults cut across the measures, making it possible for the gas coming from a broken main to find its way into the mine along the line of the fault. The danger is greatly increased when the mine is ventilated under the exhaust system of ventilation, by means of an exhaust fan or a furnace. In either case the mine pressure is below that of the outside atmosphere and any gas leaking from the main is forced into the mine.

Coal and Coke News

Washington, D. C.

Bituminous coal production in the United States during the first half of the present year was the greatest ever recorded in any half-year period, the geological survey recently announced. Estimates by the survey put the six months' output at 261,000,000 tons, a 35 per cent. increase over the first half of 1915 and a 5 per cent. increase over the last six months of that year.

The amount mined in the six months period exceeds by several million tons the record production of the first half of 1913. Increased consumption by railroads and the iron, steel and other industries is given as one cause of the increased output.

Exports in the period given were about 10 per cent. greater than in the corresponding period of the year before. Movement of coal through the Soo Canal shows an increase of 80 per cent. and coal used in coking has increased 50 per cent.

"From April, 1915, to January of this year production increased at a rapid rate, with but temporary slackening due to car shortage," said the survey's statement. "The output in January, 1916, was more than 60 per cent. greater than in April, 1915, and production in February and March this year was nearly as great.

"Users fearing shut-downs on account of labor troubles laid in large stocks and production in April declined, but May and June showed successive increases, and there is every indication that the production during the coming six months will equal that of the period just past and that the output for 1916 will exceed 500,000,000 tons, establishing a new record."

Coal Lands Are Restored to Entry

Upon the recommendation of Secretary of the Interior Lane, President Wilson has restored to entry 1,892,468 acres of land in northern and northeastern Montana heretofore included in coal land withdrawals. A large part of this area has been entered under the homestead and other nonmineral land laws, but whatever such entries have been patented since the withdrawals in 1910, reservation has been made to the United States of all underlying coal. All of this area has recently been classified by the Geological Survey and nonmineral entrymen on lands classified as noncoal land will now receive full or unlimited patent. Areas classified as coal land are opened to absolute sale and entry under the coal land laws. Surface or agricultural rights may be acquired as heretofore on these lands, under the homestead, or desert land laws or the Carey Act, the ownership of the coal in such cases remaining in the Government.

The department announced that nearly two-thirds of the area of the present restoration, 1,191,131 acres, lies in northeastern Montana in Sheridan and Valley Counties north of the Fort Peck Indian Reservation. Of this area 649,350 acres have been classified as coal land and the remainder as noncoal. The coal is lignitic in character and the land is therefore classified at the minimum price of $20 per acre where within 15 miles of an operating railroad, and $10 per acre where outside of that limit. Several small lignite mines have been opened in this region to supply local demands, but no extensive development has been undertaken. The lignite of northeast Montana, although a poor fuel in comparison with subbituminous and higher grade coal, constitutes an important fuel resource and will in time become of great value.

Another large area included in the present restoration lies along the international boundry line north and east of Milk River in Hill and Blaine Counties and is known as the northern part of the Milk River field. Only 3,239 acres of the 682,407 acres in this field were classified as coal land. The coal beds are for the most part thin and the coal is of subbituminous grade. A few local mines have been opened and have proved an important source of fuel for homesteaders in the region, but on account of the limited amount of coal the area will never be important as a coal field.

HARRISBURG, PENN.

The total number of deaths for the first half year in Pennsylvania shows that there is a larger number of fatalities in the mines of the state than in any other classification of industry. The deaths in the coal mines of Pennsylvania totaled 498. Deaths from other industrial accidents totaled 467 and there were 151 deaths from operation of public-service corporations.

In the anthracite region there were 9 deaths in the coal mines in Carbon County; 1 in Columbia; 5 in Dauphin; 15 in Northumberland; 2 in Wayne; 49 in Lackawanna; 120 in Luzerne and 66 in Schuylkill County. The total deaths in the anthracite operations for the first six months is 267 as compared with 231 in the bituminous field.

Indiana County, in the soft-coal field, records the largest number of fatalities, 50. There were 19 in Allegheny County; 30 in Cambria; 10 in Clearfield; 34 in Fayette; 13 in Somerset; 18 in Washington and 27 in Westmoreland.

Some Compensation Abuses

Available figures show that the operation of the State Compensation Act, while having reduced attorneys' fees throughout the state, has added materially to the incomes of physicians employed by large corporations to look after their employees.

At a meeting of the State Compensation Board on July 6, Chairman Mackey said that one insurance carrier alone, the United Fidelity and Guaranty Co., has paid out $166,276 in compensation claims and $148,530 in fees to attending physicians in these cases.

Dr. F. D. Patterson, chief of the state's division of hygiene and engineering, said that 50 per cent. of the fractures reduced by the medical fraternity of this country represent botched jobs. Dr. J. B. McAllister, president of the Pennsylvania State Medical Society, confessed that there are many doctors holding certificates who are not fitted to practice their profession.

Representatives of insurance companies made pathetic complaint that they are being robbed by the physicians and surgeons called in to treat injured workmen.

The purpose of the meeting of the compensation board was to hear a discussion of Doctor Baldy's (president of the medical bureau of education and licensure), report on what constitutes "reasonable medical attendance" that employers are required to furnish injured employees under the compensation law and to receive Doctor Patterson's report as to what constitutes "a major operation," a problem that has been bothering referees, insurance company adjusters, surgeons and members of the compensation board.

Doctor Baldy, who had prepared the report as to what constitutes "reasonable medical attendance" had even the "chronic kickers" with him when the discussion closed. Representatives of insurance companies contended that the standards outlined are too stringent and that it is necessary to have a medical man attend cases of minor injuries. The answer to that is that frequently the minor injury is the one that develops into a case of blood poisoning and that the companies that permit unskilled people to administer anything but first aid treatment are countenancing illegal practice of medicine and that the guilty parties will be prosecuted. To this the companies retorted that the doctors "rob them quite frequently by charging an outrageous fee for dressing a finger that had been cut." Doctor Baldy responded that the "fee grabbers" will be attended to in due season.

Doctor Patterson explained that the attendance standard outlined is not designed to provide fees for the physicians and surgeons, but to make it certain that every injured worker received proper attention in order that he might be restored to society a cured rather than a maimed man.

The Workmen's Compensation Act Is Constitutional

The decision of Justice Brown, of the State Supreme Court, upholding the constitutionality of the workmen's compensation act, was recently delivered in Pittsburgh.

Four attacks on the constitutionality of the act, which were made in an appeal in the case of William Anderson against the Carnegie Steel Co., are answered by the court.

The first was based on the provision in the fourteenth amendment to the Constitution of the United States, frequently resorted to in attacking legislative acts that one cannot be deprived of one's property "without due process of law."

This contention is groundless, Justice Brown says, pointing out that "while rights of property created by the unwritten law cannot be taken away without due process of law, the common law itself may be changed by statute."

"Indeed," the justice continues, "the great office of statutes is to remedy defects in the common law as they are developed and adapt it to the changes of time and circumstances."

The second attack on the act charged that it interfered with the right of the individual to make his own contract. Justice Brown answers this as follows:

"At the time the act was passed, the settled law of this state was that a contract limiting or releasing damages for future negligence was against public policy. The act is but a statutory extension of the same principle.

With reference to the third attack, that the act deprives the right of trial by jury, Justice Brown says:

"Nothing is to be found in the said three sections depriving employer or employee of the constitutional right of a trial by jury. They merely permit a waiver of the same, if both agree, and neither the federal nor state constitution precludes such waiver."

The fourth attack on the act was that it limited the amount to be recoverered for injuries.

"It need only be said of this contention," Justice Brown concludes, "that the amount to be recovered for injuries to an employee is limited only when the parties to the contract of employment so agree."

PENNSYLVANIA

Anthracite

Pittston—As the result of the examinations at the Pittston Y. M. C. A. on June 6 and 7, 19 applicants qualified as mine foremen in the eighth anthracite district and 7 in the ninth district; 24 for assistant foremen in the eighth and 9 in the ninth, according to the announcement made recently by the examining boards.

Port Clinton—Transportation of coal via the Schuylkill canal which has been long delayed this season was finally started by the departure of 20 boats from here last week for Philadelphia loaded with anthracite steam sizes.

Edwardsville—Fourteen first-aid teams participated in the contests of the Lackawanna division of the Lehigh Valley Coal Co. at Campbell's Park for the honor of representing the district at the general company contests at Hazle Park, Hazleton, on July 15. Two of the teams, Westmoreland and Heidleburg No. 2 colliery, made perfect scores in the team event, but the former was adjudged the winner, because the time of completing the event was slightly shorter than that of the latter. Drs. Brooks, Bixby, Woehrle, Adams and Prevost, compensation physicians for the company, were the judges. Close to 500 employees of the company witnessed the competition. The members of the Westmoreland team are Walter Jacoby, captain; Thomas Ridhely, Joseph Johnson. Michael Thomas, Edward Rezp and Edgar Rowlands, subject.

Bituminous

Charleroi—Because of labor trouble at the coal mines, shipments through Lock No. 4 were exceedingly short during June; these shipments totaled only 6,042,000 bu.

Indiana—The Pennsylvania Coal and Coke Co. is arranging to resume operations in No. 42 mine at Arcadia, which has been shut down for many years. Two 6-ton electric locomotives have been purchased for operating the mine and are now being installed. Improvements are also being made at mine No. 41.

California—Almost two acres of coal are being mined daily at the Vesta No. 4 and No. 5 mines of the Vesta Coal Co. Approximately 6,000 tons are being removed daily from No. 4 mine, while the record output for No. 5 is 5,432 tons per day.

Sharon—The Pardoe coal mine, in the eastern part of Mercer County, has been closed, after being worked continuously for 50 years. Practically all the coal has been mined in that vicinity.

Connellsville—The coke production of the Connellsville region recently rose to 423,500 tons, but was not enough to meet the demand. The shipments during the same week aggregated 437,000 tons. Substantial purchases of coal and coke were also made in the region by the Bethlehem Steel Co., which it was supposed was fully supplied with coke from the byproduct plant at South Bethlehem. The region is now operating 87 per cent. of its ovens to 91 per cent. of their capacity.

MARYLAND

Cumberland—The Consolidation Coal Co. recently loaded the first barge of the season at Georgetown, D. C., the terminus of the Chesapeake & Ohio Canal. At that point the coal is transferred from canal boats to ocean-going barges employed in the coastwise trade.

WEST VIRGINIA

Bluefield—The operators in the Pocahontas field are now experiencing one of the greatest demands for their product in the history of the field. Mining is being somewhat retarded by a shortage of labor, and it is said that the operators could use 3,000 or 4,000 more miners. It is rumored that operators have started a movement to advertise extensively throughout the country for labor in order to meet the demand for Pocahontas coal.

Panther—The Lathrop-Panther Coal Co., under the management of Col. William Leckie, recently opened a new amusement hall called the Bide-a-Wee. This is the outcome of an effort to make the mining camps ideal. The Bide-a-Wee is a substantial bungalow type of building consisting of a theater 40x50 ft., with a seating capacity of 350. There are also reading rooms, one for white and one for colored employees, also a poolroom for each. A soda fountain is located in the front of the building in an ice-cream parlor. Later on the basement will be arranged for shower baths.

Morrisville—The tipple of the Royal Block Coal Co. was recently wrecked by a trip of mine cars getting loose at the knuckle. Repairs will be completed shortly.

Mucklow—It is said that preparations are being made to reopen the mines of the defunct Paint Creek Collieries Co., at this place and at Tomsburg.

KENTUCKY

Whitesburg—A party of Eastern capitalists and operators has been making an inspection of coal lands on the North Fork of the Kentucky River with a view to lease and immediate developments.

Hazard—The Columbus Coal Mining Co., owner of the rich Walker Branch lease, has let contracts for construction of a railroad and bridge to connect the mine with the main railroad line. George W. Eady & Co. has the contract for the bridge and Sullivan & Adams, Louisville, the contract for the railroad. It is estimated that the cost of the improvements will run to $60,000.

Pineville—The Four Mile Coal Co., at Rim is closing up its business and, it is reported, will lease its mines, several offers being now under consideration. The commissary stock has been sold to the Federal Coal Co. at Straight Creek. The mines of the company were purchased of the Continental Coal Corporation several years ago by Chattanooga interests and have been in operation until recently.

Barbourville—The Harlan Coal Mining Co., of Louisville, which possesses wireless telegraph service between the Harlan County coal field and in southeastern Kentucky and Louisville, reports successful experiments with a newly installed apparatus at its Coxton mining plant. Messages were perceived as far away as Pensacola, and the Government station at Arlington. The mining company expects to carry on its routine correspondence between the mines and the Louisville office by wireless.

OHIO

Columbus—Considerable activity in opening new mines in the Hocking Valley district is being shown both by the George M. Jones Co., which took over the Continental Coal Co.'s properties and the Sunday Creek Coal Co. The George M. Jones company announces the working of six mines and that steps are being taken to put five others in operation. Within two weeks it is announced mines Nos. 267, 210 and 211 will be in operation and Nos. 301 and 309 will be put in shape as soon as possible. The Sunday Creek Coal Co. will put two of the company's mines at San Toy in operation at once. A mine, No. 10 at Mortonville on the Toledo & Ohio Central, will be placed in operation before the middle of July. Pittsburgh No. 1 mine of the company at San Toy will be put in commission in the near future. Other mines are expected to be in operation by Aug. 1.

Bellaire—It is reported that the Rail and River Coal Co. No. 2 mine in South Bellaire, has been abandoned, and will not be again worked by that company. This mine was at one time the finest in the local district, but has not been worked since before the big strike of more than two years ago. Local parties have secured an option on some coal lands adjoining the Rail and River No. 2, and will use this entrance for securing their coal.

ILLINOIS

Belleville—Operators and union officials have returned from Chicago, where they attended a three days' session of the executive boards of the Illinois Coal Operators' Association and the United Mine Workers. A number of technical matters of dispute were taken up and disposed of.

Carlinville—The United Mine Workers of Staunton have filed in the Circuit Court here an injunction suit against the township road commissioners to restrain them from collecting the $2 poll tax. At the last election the men of the township voted to abolish the tax. Through a mistake no ballots were prepared for the women to vote on the subject. The commissioners hold that the tax was not abolished by a majority of all the votes cast and will proceed to collect the tax unless the injunction suit is successful.

Springfield—Fire was discovered late one night recently in the mine of the Springfield Co-Operative Coal Co., 2,800 ft. from the foot of the shaft. Employees of the mine, called to fight the fire, found that they did not have enough hose. The Springfield fire department furnished 3,500 ft. of the city's hose. The workmen fought the flames all night and all the following day and finally extinguished them. The fire is attributed to spontaneous combustion. Peter Beaghan, the mine manager, was struck by falling slate as he was going down an entry and was so badly injured that he had to be taken to a hospital.

UTAH

Parowan—Alexander H. Rollo reports the discovery of a rich bed of coal 9 mi. from Parowan. The vein has been opened and shows coal in considerable quantities and of good quality. This discovery is regarded as of considerable importance to southern Utah. A company has been incorporated under the name of the Parowan Coal Co. to operate the mine.

FOREIGN NEWS

London, England—Announcement is made that the Consolidated Cambria Co., D. A. Thomas and A. Mitchelson, of Cardiff, have purchased the entire common stock of D. Davis & Son, colliery owners, amounting to nearly £2,000,000. The companies will be merged and be under the control of Lord Rhoudda (D. A. Thomas). The normal annual joint production will be about 5,000,000 tons of steam coal.

PERSONALS

J. A. Teegardin, sales manager of the New York Coal Co. for several years, was recently elected vice-president in charge of sales.

L. E. Walker has resigned his position with the West Graham foundry to accept the position of foreman in the general repair shop of the Carter Coal Co., at Coalwood, W. Va.

Corporal MacAskill, of Lethbridge, Alta., who enlisted with the 101st Fusiliers for service in the European War and was invalided home, has been appointed superintendent of the mine-rescue station. He is a mining expert.

L. O. Gregg, for the past two years with the coal mining interests of J. C. Cosgrove, in Cambria, Indiana, and Somerset Counties, Pennsylvania, as electrical engineer, has resigned to accept a position with the Ridgway Dynamo and Engine Co., of Ridgway, Penn.

John S. Jones, president of the Sunday Creek Coal Co., which has offices in Columbus, has been elected president of the Wisconsin & Northern R.R., according to announcement received from Milwaukee. Mr. Jones will take the place vacated by the death of Charles R. Smith, of Menasha.

Joseph Lippincott, for many years inside foreman at Pine Ridge colliery, Miners Mills, has been promoted to the position of inside foreman at Baltimore colliery, at Parsons, Penn. **J. D. Campbell,** inside foreman at the Delaware mine, has been promoted to fill the vacancy caused by Mr. Lippincott's transfer.

OBITUARY

Samuel Upton, foreman electrician for the Hudson Coal Co., was recently killed by electric shock through coming in contact with low-tension wires, which had in some way become charged by higher voltage. He is survived by his widow and four children.

Harry M. Speece, aged 56 years, died suddenly at his home on the night of July 4. Mr. Speece had attended a ball game in the afternoon, went to his club, and after partaking of dinner accompanied by his son went to watch the display of fireworks near his home. While watching the fireworks he was seized with severe pains and died soon after reaching his home. Mr. Speece was first employed by the Lehigh Valley Coal Co. about the time that F. M. Chase, now vice-president, started in the office. Later he worked for the Hanover Coal Co. and the Hillman Vein Coal Co. For the last 18 years he has been in the coal sales department of the Lehigh Valley Coal Co. and as sales agent has covered the territory from Pottsville to Sayre. He is survived by his wife and two sons.

INDUSTRIAL NEWS

Gatliff, Ky.—The Mammoth Blue Gem Coal Co. has increased its capital from $25,000 to $30,000.

Wilmington, Del.—A charter has been granted to the Fentres Coal Corporation, with a capital stock of $600,000.

Boston, Mass.—Shipments of bituminous coal on the New Haven railroad is limited to 50 per cent. of the daily average shipments received by the road during June, 1915.

North East, Penn.—The Electrical Materials Co. is doubling the capacity of its plant. It has also constructed a substantial new office building which is nearly ready for occupancy.

Soddy, Tenn.—The Durham Coal and Iron Co. is erecting a large Stuart patent coal washing plant. The contract for this improvement was recently awarded to the Roberts & Schaefer Co. of Chicago.

Columbus, Ohio—The Wampum Mining Co., Columbus, Ohio has been organized with a capital of $20,000. The incorporators are T. P. Linn, S. P. Outhwaite, Ralph G. Martin, E. J. Reynolds and E. Bragunier.

Indianapolis, Ind.—The Power Colliers Co. of Indiana has been organized at Clay City. The capital is $125,000 and the purpose coal mining. The directors are George G. Rowland, I. W. Aten and W. S. McCloud.

Rochester, N. Y.—The Erdle Perforating Co. is building a 50x300 fireproof, concrete addition to its factory. This addition will double the manufacturing capacity, and will be ready for occupancy about Aug. 1.

Huntington, W. Va.—The Big Eagle Mining Co. recently awarded the contract for a combined steel tipple and balanced bucket hoisting machinery for a shaft mine to the Roberts & Schaefer Co. of Chicago.

Bellville, Ill.—Marissa capitalists recently secured a controlling interest in a large mine at Herrin. This proposition looks like a good one for those acquainted with the situation, and it would appear that success was assured.

Pittsburgh, Penn.—The contract for the United States Bureau of Mines Experimental Station to be built at Forbes St. and Woodlawn Ave. has been awarded to George D. Wills Co., of New York, the contract price being $287,540.

Nashville, Tenn.—The Brookside Coöperative Coal Co. has been organized with a capital of $20,000 and with chief works in Knox County. The incorporators are L. M. Deweese, C. L. Larew, H. O. Acuff, I. M. Deaver and G. M. Flatter.

Boston, Mass.—The New England Coal and Coke Co. has chartered its steamer "Newton" to the Dominion Coal Co. for a trip to Louisburg, C. B. and return to Everett with 7,000 tons of coal. She will probably enter the South American trade upon her return.

Jersey City, N. J.—The Joseph Dixon Crucible Co. recently notified its employees who had joined the National Guard prior to its being called by the President and subsequently sworn into the federal service, that they would receive full pay while away doing military duty.

Dover, Del.—The Trinity Coal and Iron Co. has been organized with a capital of $10,000,000 for the purpose of acquiring lands containing coal, iron, lead, zinc, copper, etc. The incorporators are Clarence J. Jacobs, M. L. Rogers and Harry W. Davis, all of Wilmington, Del.

Worcester, Mass.—The Riverside Coal Co. has been organized with a capital of $250,000 for the purpose of carrying on a coal-mining business at South Fork, Penn. The incorporators are Joseph W. Gorman, James Montgomery and Benjamin H. Hill, all of Worcester, Mass.

Big Stone Gap, Va.—The Intermont Coal and Iron Corporation has been organized with a maximum capital of $500,000. The incorporators are G. R. Irvine, president, of Big Stone Gap; L. M. Williams, vice-president, of Richmond, Va., and J. W. Kelly, secretary, of Big Stone Gap.

Whitesburg, Ky.—The Kenmont Coal Co., recently organized at Jeff, will build a $125,000 coal-mining plant. G. A. Case, of Zanesville, Ohio, is president; L. K. Brown, of Zanesville, secretary. This plant is to have a capacity of 1,500 tons daily. About 2,000 acres will be developed.

Sullivan, Ind.—The Vandalia Coal Co. is purchasing land in Sullivan County, and is expected to begin drilling test holes in a short time preparatory to sinking several new shafts. Ayrdale Coal Co. purchased the old mine at Antioch and work has begun in cleaning up and repairing the property.

Clarksburg, W. Va.—Work will start shortly on the extension of the Monongahela Valley Traction Co.'s line from O'Neill to Wolf Summit, giving electric railway transportation facilities to a rich country, with important developments in coal and in gas. It is understood that the survey has been completed.

Crooksville—Rend's mine which has been idle since April 1, has a force of workmen at work cleaning up and will be in full operation within the next ten days. The mine, which is the property of the Standard Hocking Coal Co., of Chicago, employees 200 men and has a monthly payroll of from $10,000 to $12,000.

Moundsville, W. Va.—Negotiations are now under way for the sale of the Parrs Run Coal Co.'s property. It is stated that when the new owners take possession, early in July, improvements to the outside will be made to take care of an output of not less than 800 tons per day, and probably more. It is said that the prospective owners have large contracts for coal.

Huntington, W. Va.—Announcement was recently made of an important coal deal whereby the Eagle Island Coal Co. acquired the Crown Coal and Coke Co., both operations being on Buffalo Creek, in Logan County. By the terms of the deal, the total annual production of the Eagle Island Co. is increased to approximately 200,000 tons.

Wellsburg, W. Va.—It is stated that several coal mines up Buffalo Creek near the second bridge will be developed shortly. It is also stated that the McKinley interests will open up the property. It is expected that between 50 and 60 new houses for miners will be built at that point. The railroad which the Pennsylvania will build between Wellsburg and Washington, Penn., will pass by the new developments.

Philadelphia, Penn.—One million dollars worth of bonds of the Old Ben Coal Corporation of Illinois are being placed on the market by local bankers, with the Commercial Trust Co. of this city acting as trustee. The bonds are based on a first mortgage and draw interest at the rate of 6%, with state and income taxes to be refunded to the holders. The sale is being met with a ready response.

Whitesburg, Ky.—The Elkhorn Byproducts Co. has been organized by Louis E. Harvie, Sam Collins, of Whitesburg, and Perry Gorman, of Harvard, Ky. The capitalization is $20,000 and the initial work of development of the Sol Potter coal land tract at Yount's Fork near Hemphill has been started. Perry Gorman is manager of the new plant, at which several hundred men will be given work when the operation is started in full.

Wellsburg, W. Va.—Preliminary work looking toward the early development of the coal deposits of the Buffalo Valley was recently started. It is understood that the plans of the company provide for the change of the tipple from its present location about two miles from this city to a point on Tipps Run. In addition to the dwelling houses already on the land, it is proposed to erect at least 150 tenant houses for those who will be employed at the mines.

Cedar Point, Ohio—One of the big features of the forthcoming annual meeting of the Michigan-Ohio-Indiana Coal Association, which will be held at this place the first week in August, will be the large display of mining and coal-handling machinery to be shown in the large exhibition hall. This exhibition will be larger than usual. Judging from the number of reservations, the attendance at the meeting will be the largest in the history of the organization.

Clarksville, Penn.—W. H. Warner, of Cleveland, Ohio; J. Y. Humphreys, of Pittsburgh, and associates have made preparations to develop a tract of 500 acres of coal lying on Ten Mile Creek not far from the village of Clarksville. No coke ovens will be erected at this operation, but its activities will be confined to the mining of coal for shipment to independent byproduct coke plants. An extension of the Pennsylvania R.R. from Besco to the new operation has already been authorized.

Somerset, Penn.—The Sterling Smokeless Coal Co. operating in Conemaugh Township recently petitioned the court to appoint jurors to condemn a right of way 118 ft. long for a railroad from its mines to the tracks of the Somerset & Cambria road over land owned by another coal company. This action portends the contemplated opening of an extensive mining operation near Foustwell where the Sterling company last winter purchased a tract of several hundred acres and plans extensive developments.

Rochester, N. Y.—The Stromberg-Carlson Telephone Manufacturing Co. recently purchased the entire telephone business of the Garford Manufacturing Co. of Elyria, Ohio, this purchase including the goodwill of the business and all patents, tools, patterns, drawings, records, etc., relating to or used in the manufacture and the sale of telephone apparatus. The Garford Company's sales, engineering, switchboard and installation departments will be merged with those of the Stromberg-Carlson Co.

Washington, D. C.—The United States Civil Service Commission recently announced an open competitive examination for structural steel draftsman for men only. From the register of eligibles resulting from this examination certification will be made to fill vacancies in this position in the Bureau of Yards and Docks, Navy Department, Washington, D. C. Persons who meet the requirements and desire this examination should at once apply for Form 1312, stating the title of the examination desired, to the United States Civil Service Commission, Washington, D. C.

Ashtabula, Ohio—It is predicted that July and August, usually light months as far as coal movement on the lakes is concerned, will this year be heavy. The mines of the Pittsburgh District which have been idle for some time pending a settlement of differences between miners and operators recently resumed operations and large quantities of coal were started lakeward. The coal trade from this port has been light for the past few weeks, but it is thought that a share of the coming rush will fall to Ashtabula and that machines will be kept busy. At present most of the boats are going back light.

Atlantic City, N. J.—The Interstate Commerce Commission is this week giving a hearing in two important coal freight rate cases, for which a number of officials from both mining companies and railroads, together with their counsel, have gathered here. The first case to be heard is that to prevent the railroad companies from raising rates on shipments of coal from the bituminous districts of Pittsburgh, Fairmont, Kanawha, Kenova, Thacker, eastern Tennessee and Kentucky. The other case is against the same railroad companies wherein it is sought to compel them to reduce rates to Lake points.

Cleveland, Ohio—According to reports some fancy prices are being paid for lake boats for ocean traffic. The steamers "F. K. Lisman," "M. E. Harper" and "Penobscot," built a few years ago, have been sold to the Oriental Navigation Co., for $2,287,500, or just $762,500 each. The steamer "Edison Light" has been sold to the same company by C. H. Sprague & Son for the same price. These boats are full Welland Canal size and were built by the Great Lakes Engineering Co., at a cost of approximately $250,000 each. The selling price has practically tripled during the past two or three years the contract price.

Baltimore, Md.—The Elkhorn Coal Corporation, which is controlled by Baltimore people and their associates, will shortly begin the opening of mines on its extensive coal property in the Elkhorn Valley. This development will open up approximately 25,000 acres of the most valuable coal mines in the world. It is understood that the management is at present planning to open from 6 to 12 mines on Long Fork of Beaver Creek. In order to tap the new mines the Baltimore & Ohio R.R. has planned to build extensions to the property. The new lines will be about 30 mi. long and construction work on these extensions will be started immediately.

Washington, Penn.—At a recent meeting of those interested in the United Coal Co. reorganization was effected, the new concern being named the United Coal Corporation. This corporation will start without indebtedness and with over $1,000,000 in cash and receivables. All note-holders of the old company for every $1,000 in notes will be given $625 worth of preferred stock and $825 worth of common stock. The capitalization of the company is not announced. Neither has the policy of the concern been given out, but it is understood that coal mining will be carried on by the most modern and businesslike methods. Headquarters of the firm will be in Pittsburgh.

St. Louis, Mo.—The United States District Court has confirmed the lease of the Southern Traction Co. railroad between East St. Louis and Belleville to the East Side Belt Ry., which will operate it for the present as a coal road exclusively. Connection will be made with the Municipal Free Bridge, now nearing completion, and a St. Louis yard of large proportions will be provided. An organization to look after the selling end in St. Louis is being formed. For the present the road will be operated by steam, but later electric power will be substituted. At present there are three mines on the road, the Vulcan and Lattman's south of Belleville and the New National in Belleville. John T. Taylor, of Belleville, has been appointed general superintendent and is getting the road ready for operation. Shipment of coal will begin in a short time. The road has been in the hands of William E. Trautmann as receiver since the failure of the Southern Traction Co. This is the enterprise in which William Lorimer of Chicago sank considerable money.

Market Department

General Review

Warm weather fails to influence anthracite trade. Bituminous shows strength, contracts absorbing current production.

Anthracite—The maximum temperatures of the season have failed to affect the sentiment in the anthracite trade which continues surprisingly firm for this season all along the line. The most determined efforts on the part of retailers to force prices down on certain grades, as for instance pea coal, have proved generally futile, and they are now gradually realizing that they must be prepared to meet full schedule prices. At outlying points both to the West and East there is open anxiety concerning the matter of fall stock. The scarcity of supplies and slow water movement to Down East points have made it impossible to accumulate anything approaching the customary summer supplies and there is every indication of a widespread shortage in that direction. The unusual strength of the market is undoubtedly due primarily to the limited production in the mining regions resulting from the restricted labor supply rather than to any concerted action on the part of the producing interests to maintain prices as is thought in some quarters.

Bituminous—The market if anything shows still greater strength. The demand on contracts is very nearly enough to absorb the current production while many large consumers who have been drawing on large stocks accumulated in anticipation of a suspension in the spring are finding these exhausted and are being forced into the market. The only adverse factor in the situation is that prices in many instances have failed to respond to the improved conditions and are not yet at a very profitable level. Resumption of operations in the Pittsburgh district have not been sufficiently general to relieve the pressure for gas coals, and there is not much of these offering. It is developing that some of the buyers at Down East points, where supplies are especially short, have overstayed the market, and there is little hope of their obtaining supplies at current figures. The demand is not as yet urgent, but there is a distinct feeling that coal will be difficult to obtain from now on, and it is a significant fact that some far-sighted consumers are looking for additional storage space in which to put by reserve stock. Operators on the other hand are withdrawing options and orders as a rule are only going out on firm business.

Lake Trade—All indications point to a record-breaking demand for coal over the balance of the year. In spite of the hot weather, mines continue working at the full capacity of the labor supply, which is somewhat limited, and consumption continues large in all lines; activity in the iron and steel industries is especially pronounced, while ore shipments from the upper ports have been outstripping all previous records the last two months. The movement on contract is heavy, leaving too little coal available for the spot market. Congestion on the railroad is the most serious problem now facing the trade; more reports of delays are coming in as the shipments to the Lakes increase, while the exceedingly heavy ore movement is tending to accentuate the trouble. If nothing develops to interfere the 1916 coal shipments on the Lakes will break all previous records.

Middle West—The market has been quiet since the holiday period, but it is evident that there is an excellent undertone and an active situation is anticipated later. Some additional railroad tonnage has been covered by contract, which has eliminated this buying as a factor in the prompt market. Screenings continue stiff as to prices in spite of the increased production, and indications are that they will continue so for some time. The country retailers are beginning to buy storage coal, and the harvesting demand is also absorbing a considerable tonnage. There is scarcely any consignment coal noted and supplies at the distributing centers are at a minimum. The market is particularly good on the Indiana coals, reports from that section indicating a heavier production and better prices than ever before in the history of the trade at this season. Lake coal promises to be very scarce and Eastern mines are already receiving inquiries for shipments all rail.

A Year Ago—Anthracite being offered at heavy concessions. Large accumulations of nut coal. Export bituminous trade continues the predominating feature. Domestic market lifeless. Improved tone in the Middle West.

Business Opinions

Boston News Bureau—On the surface the situation is much less promising. Prices of everything from products to securities are on the down grade. This not only checks the buying power but increases liquidation. Sentiment is therefore adverse and the tendency is to play the defensive rather than the offensive.

New problems are offering every day. The successful arrival of the Deutschland opens a new speculative field. If Germany can break the blockade of Great Britain, even to a limited extent, it will prolong the war.

There is the money market to consider. The reserves of the New York national banks are now smaller than they have been since the federal bank system was inaugurated. Banks are now endeavoring to strengthen themselves. There is still abundant money but banks are more discriminating.

Europe is now sending us our securities. These securities are to be either sold or borrowed upon, and either case it is not particularly favorable to either prices or money.

There is no question but that general trade is falling off, surely so far as new business is concerned. The foreign orders for war munitions have shrunk greatly, and domestic trade is not likely to expand largely until we know more about our harvests.

It is remarkable, however, how quickly and radically sentiment can change at times. We have passed the speculative "boom," and now see very little good in anything. But this very liquidation which we are seeing is the proper corrective. The situation will be all the stronger for it.

Without question the bargain counter is becoming attractive. No one can tell how far the present downward course will continue. When the turn comes it will probably come quickly. Prices have simply been attacked; values remain, even if not to the extent estimated five to six months ago.

American Wool and Cotton Reporter—Much more interest is manifested in the woolen goods market at present than there has been in recent weeks because prices have been named for the light-weight season by the leading sellers and by some others having similar fabrics for sale. The summer cloth business is to be one of the big developments in the light-weight season. The dye stuffs situation is undoubtedly much easier than it was, with a greater supply of colors available, but up to the present time conditions have prevented any important reductions in dye stuffs quotations.

The cotton goods market is strong. Prices are advancing and the number of contracts being placed is increasing. The supply of cotton goods in the hands of distributors is not large. It is, therefore, believed that cotton manufacturers are justified in holding off buyers and in waiting for higher prices. The outlook is favorable at the present time and is likely to improve somewhat in the comparatively near future.

Marshall Field & Co.—Current wholesale distribution of dry goods has been in excess of the corresponding period of a year ago. Road sales for immediate and fall delivery are running well ahead of the same week 1915. Buyers have attended the market in much larger numbers. Collections are ahead of the same period last year.

Dun—Competitive buying has abated and business moves under reduced momentum, though with surprisingly little shrinkage in its volume. This is the period of all others when a decided halt is to be expected, as many plants ordinarily stop for needed repairs, and inventories and vacations are calculated to bring comparative quiet in commercial channels. Yet this year is an exception and much less than the customary lull is now apparent, while indications foreshadow unusual activity throughout the summer. Commercial failures this week in the United States are 227 against 256 last week, 281 the preceding week, and 336 the corresponding week last year.

Bradstreet—Warm weather has improved retail trade, enlarged orders and developed better crop conditions, but seasonal recessions, half-yearly inventories, holiday observances and a disposition to feel out the price situation have superinduced a slight pause in some of the larger lines. Temporary calm fails to detract from the extraordinarily good outlook, which pressages excellent business for months to come, this, too, following a record half year, whether measured by bank clearings, pig-iron production, mine outputs, factory production or business turnovers.

ATLANTIC SEABOARD

BOSTON

A stronger market, the Hampton Roads coals being rather short, with prices firm at $2.85. Georges Creek shipments slowing up and Pennsylvania agencies withdraw prices. Anthracite coming forward too slow to suit the trade.

Bituminous—The market shows more strength than for several months. Pocahontas and New River in particular are in a firmer position; instead of heavy accumulations there is now a real shortage among several of the Hampton Roads shippers. Certain of them have been obliged to decline to load steamers due to arrive on coastwise contracts and a few are actively buying from the smaller agencies in order to clear their boats. Shortage of labor is affecting the West Virginia fields as elsewhere and there is prospect that the smokeless coals will be in continued short supply the balance of the season.

It begins to look as if some of the Eastern buyers had over-stayed, for there is little hope now of getting the Hampton Roads coals forward on new purchases except at outside prices. Every factor in the business is shy of taking on new obligations and transportation is just as hard as ever to secure. While there is no flurry of any kind and there is only a light inquiry for spot coal, yet there is a strong feeling that from now on Pocahontas and New River will be hard to secure. Prices are firm at $2.85 f.o.b. and the next move will be upward.

For inland delivery there is also a better demand, particularly from consumers who realize the great advantage of providing abundant storage for fall and winter use. Plants where more than a three or four months stock was out of the question are now spending money to secure extra space. The ability of the railroads to get deliveries through from the mines is being discounted and even such short-line hauls as from Boston or Providence are not being relied upon to the extent that was customary.

Georges Creek shipments to this territory have slowed down measurably, both all-rail and at Tidewater. Tows are moving slowly and the shippers are falling behind on their contract obligations. No new business is being undertaken and only those with contracts are getting coal in any volume. It is still available f.o.b. in moderate quantities.

The Pennsylvania grades show further signs of firmness and the prospect of good business ahead, output considered. Operators who were offering coal a few weeks ago have now practically withdrawn from the market. Options are not left out now for more than a few days, so confident are most of the shippers that prices will soon begin to advance. There are some who are accepting orders only for July and August. All-rail shipments are coming through reasonably well but not fast enough to enable consumers to stock ahead very much. A moderate amount of anthracite barge space is available for Philadelphia loading, but the aggregate is not large and is not really affecting the Tidewater market in any particular. A little coal stays long enough at the piers for demurrage to accrue but most of the shippers are sending it down only on firm orders.

Anthracite—The holiday suspension has affected the volume of domestic sizes for this market. Shipments are again very slow and while dealers are not as a rule alarmists there are many in this territory who are fearful of conditions this fall and winter. A widespread shortage is regarded as certain and some of the more outspoken members of the trade are urging the public to take coal early. There are so many local difficulties in the mining regions, so much unfavorable weather for moving barges, and the shippers who are sending coal to this market are so loaded with orders that there is reason for all the anxiety that exists.

Egg continues in the shortest supply and the scarcity is proving very embarrassing to most of the city dealers. Stove coal is none too plentiful and some of the special coals are not short. The ports along the coast that usually take schooner shipments are confronted with such high freights that exertions are made to get supplies by rail from points like Portland and Bangor.

Bituminous quotations at wholesale, f.o.b. loading ports at the points designated, are about as follows, per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.35@2.85	$2.65@3.15	.....	$1.10@1.60
Cambrias and Somersets	2.60@3.00	2.90@3.30	.....	1.35@1.75
Georges Creek (contract)	3.07@3.17	3.27@3.37	$3.00@3.10	2.00@2.10

Pocahontas and New River, f.o.b. Norfolk and Newport News, Va., are $2.85. On cars Providence and Boston prices are $4.85@4.95.

NEW YORK

Anthracite market strong. Heavy demand continues. Bituminous situation still better, with higher prices in sight. New England shipments still restricted.

Anthracite—The anthracite situation is in better shape than it was a week ago. Egg and stove coals continue in good demand and the call for chestnut is becoming stronger, due probably to the shortage in the two other sizes. There is a good demand from the Northwest and Lake shipments are heavy but shippers complain of a scarcity of vessels. Reports from the West indicate a shortage of prepared coals and some shippers are already anxious as to what may happen in the late fall and winter.

Pea coal continues easy. Buckwheat No. 1 is in better shape and some shippers say that from 20 to 25c. per ton more can be secured for it than last week. Prices for rice and barley are firm. Unfavorable reports are current concerning boiler coal; it is not being well received and some shippers say that the buyers are returning to the use of rice and barley.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$4.95	.....	Pea	$3.75	$3.50@3.75
Egg	5.25	$5.20@5.25	Buck	2.75	2.45@2.75
Stove	5.45	5.40@5.45	Rice	2.25	2.20@2.25
Nut	5.55	5.40@5.55	Barley	1.75	1.75@2.00
			Boiler	2.20	

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—The bituminous market is on the up-trend and the next few weeks will probably see much higher prices. Conditions are better than in some time and most quotations are higher by from 5 to 10c. than a week ago. The improvement extends through the various coals. Indeed, some shippers predict new record high prices before the end of the year.

Many large consumers who stocked heavily in anticipation of labor trouble in the spring are now running low and will soon be in the market for new supplies. Some of these have refrained from making contracts, depending upon previous conditions to buy cheaply, but they are now realizing that conditions from the production end are different than heretofore and that operators are in a position to get better prices.

Rail shipments to New England are again under restriction. Many small shippers receiving supplies at South Amboy are also under embargo. Considerable coal is on its way to Tidewater and many boats are tied up at the docks.

Some shippers report all the business they can attend to while there are others who say conditions are not very active. Gas coals are short in this market and there is little offering on the high-grade steam coals.

The bunkering business is good, and many inquiries are being received regarding export coals.

Current quotations gross tons, at Tidewater for the various grades follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.50@3.65	$3.50@3.65	$3.50@3.65	$1.95@2.10
Georges Creek Tyson	3.10@3.30	3.10@3.30	3.10@3.30	1.55@1.75
Clearfield: Medium	2.95@3.10	2.95@3.10	.....	1.40@1.55
South Forks	3.20@3.30	.....	.....	1.65@1.75
Nanty Glo	3.10@3.20	.....	.....	1.55@1.65
Somerset County: Medium	2.90@3.00	2.90@3.00	2.90@3.00	1.35@1.45
Quemahoning	.....	3.00@3.10	3.00@3.10	1.45@1.55
West Virginia Fairmont ¼	.....	3.80@3.90	3.80@3.90	1.00@1.10
Fairmont mine-run	.....	3.80@3.90	3.80@3.90	1.00@1.10
Western Maryland	.....	2.80@2.90	2.80@2.90	1.25@1.35

PHILADELPHIA

Anthracite in good condition and little shading of prices. Stove in strong demand. Collections fair. Price commission starts investigation. Good tonnage of bituminous moving, with prices unchanged.

Anthracite—While there is no particular activity to the trade there is a healthy tone as compared with mid-July of former years. The hot weather, of course, is having an effect, but even at that the output of the mines with their restricted hours and shortage of labor occasionally fails to meet the demand.

The retail trade is still anticipating stocking yards with companies' pea coal at bargain prices; it is surprising how many dealers are holding off hoping for a break. The big companies have been approached with tenders of large orders at a cut price, which they have firmly declined. The dealers cannot seem to realize that they are going to pay 55c. to 65c. per ton in excess of last summer's prices. As a result much of the current trade on this size is being absorbed by the individuals at prices ranging from $2.25 to the big buyer to $2.50 for the smaller retail man. As these smaller operators

will be unable to meet the situation when the real demand comes some dealers are doomed to disappointment and large consignments are sure to be made during September and October at the maximum rate of $2.80.

Egg and stove orders are equal to the output and little cutting is being done to the ordinary trade. These sizes have been shaded to $3.85 and $4.10 where the orders have helped to move chestnut. Stove size is in quite short supply and the companies are considerably behind their orders on it.

Some are inclined to believe that the strength of the market is due to the somewhat limited tonnage coming into this section and not to any determination of the individuals to procure top prices as is generally thought. One hears of too many instances where they have broken faith with each other to believe that. With the possible exception of one instance the big companies have shown a laudable disposition to adhere to the circular prices.

It has been noticed for the past two weeks that coal is coming to market in an improved condition with the preparation and sizing up to the old standard, particularly on chestnut and the smaller sizes.

This week the city authorities have been asking for bids on a deficiency basis to cover supplies of coal for the various pumping stations. The city is also asking tenders on a considerable tonnage of the new boiler fuel.

On account of the regular contract business being postponed by the deliberations with the miners in the spring, the salesmen of the coal companies are putting in one of the most active summers for many years. The contract business is nearly all closed now, with only a small tonnage still outstanding; quite a number of large contracts are known to have been covered this week.

Collections if anything have shown a slight improvement, as a number of companies paid the tax refund recently and this has helped to clean up many old balances. This tax has now been refunded by practically all shippers, with the exception of one of the largest companies; this company states that the refund will be forthcoming but does not state when.

The commission to investigate the increase in the price of anthracite coal have at last started their investigation by sending a letter with a series of questions to all the dealers in the city.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.75	Buckwheat	$1.65	$2.55
Egg	3.95	5.05	Rice	1.00	....
Stove	4.20	5.30	Boiler	.90	1.80
Pea	2.60	3.50	Barley	.75	....

BALTIMORE

Bituminous movement well up to production and prices remain firm. Anthracite trade flat. Exports improving slowly.

Bituminous—Prices remain firm for steam coals, due to the fact that the movement on contract is now well up to the production which is limited by the labor shortage. There is now little chance of any break in prices, even though demand on new business is very poor. The gas-coal situation remains firm. The Lakes are still taking considerable coal, and this undoubtedly helps support the market.

Prices to the trade are about as follows, at the mines, per gross ton: Georges Creek, Tyson, $1.75; Miller vein, $1.55; Quemahoning, $1.60; Somerset, $1.45; Freeport, $1.15; Fairmont, gas, three-quarter, $1.25; same, mine-run, $1.20 to $1.25; slack, $1.20.

Anthracite—A flat period is the general verdict of the hard-coal trade here. No great activity is now expected before the latter part of August.

Exports—The export situation is slowly improving. During the past week the total loading was 22,771 tons, despite the three-day holiday period over the Fourth. While official figures for the June shipment have not as yet been announced by the Custom House they will approximate 80,000 tons.

HAMPTON ROADS

Stocks depleted and little coal in transit from mines. Movement good both coastwise and export. Shortage due to scarcity of labor at mines. Little business done in anthracite.

While the past week has held up well as to tonnage dumped over the Hampton Roads terminals, the present week starts with little coal on hand. The shortage seems to be felt by nearly all shippers and will hardly be relieved during this week. The light output is caused by minor labor troubles. This condition has prevailed in both the Pocohontas and New River fields for some time and is now beginning to be felt in earnest at Hampton Roads. The three railroads serving Hampton Roads are giving excellent service with the small tonnage of coal in transit.

Exports have continued good for the past week. Two cargoes are of especial interest, one to Punta Arenas, Chile, and the other for Oran, Algeria. Freights continue to decline and this will no doubt stimulate exports. Present rates to the Plate are quoted at some $16.80, a reduction of about $3.60 in a short time.

Business coastwise shows some improvement since last week, most of the tonnage being on contract though some new business to coastwise ports is noted, also.

Bunker steamers are arriving in satisfactory numbers, quite a few coming through the Panama Canal and stopping at Hampton Roads to coal for the voyage across.

Anthracite is inactive, though some little business is reported.

The extremely light stocks of Pocahontas and New River are causing a stiffening of prices.

Current quotations are as follows: Pocahontas and New River mine-run, for cargo, $2.85@3 per gross ton. Pocahontas and New River, for bunkers, $3.30 per gross ton plus trimming. Pocahontas and New River, on tracks, $2.75 per net ton. Anthracite, $7.50 per net ton delivered.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

	Week Ending				
Railroad	June 10	June 17	June 24	July 1	July 8
Norfolk & Western	186,272	153,958	171,394	160,108	114,026
Chesapeake & Ohio	118,800	57,468	95,365	70,905	91,311
Virginian	81,917	39,032	83,408	94,029	94,016
Totals	386,998	250,458	350,163	325,032	299,353

Ocean Charters and Freights

OCEAN CHARTERS

Coal freight charters have been reported as follows during the past week:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Josey	Antilla	1,670	
Ramos	Cartagena		
G. S. Smith	Manzanilla	495	
C. E. Look	Halifax	457	$3.75
M. Hendry	Halifax	249	
F. Creadick	Cardenas	1,200	

BALTIMORE

Vessel	Destination	Tons	Rate
Ocland	Daiquiri	1,874	
Georgios	W. C. Italy		$30.30

VIRGINIA

	Rio Janeiro		$17.75
	Rio Janeiro		17.75
Davenport	Azores	634	14.00
Smith	Surinam	528	
H. Sherwood	Lisbon	522	15.00

OCEAN FREIGHTS

A number of steamers were chartered in London during the past week, to load at United States ports for Lower Plate ports at $15 to $15.30, but we understand that these rates were made by the British Admiralty, and very much higher rates are being offered for this voyage on commercial coal. Two large steamers were reported during this period as having been chartered for coals from Virginia to Rio at $17.75 net, with very quick despatch guaranteed for discharging, and a steamer was chartered for coals, from a U. S. port to a port in the West Coast of Italy, at $28.80.

We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$4.25 about	Bermuda	$4.50@5.00
Cardenas or Sagua	5.50@6.00	Vera Cruz	6.00@6.50
Cienfuegos	5.25@5.50	Tampico	6.00@6.50
Port au Spain, Trinidad	6.25 about	Rio Janeiro	[4]17.75@18.25
St. Lucia	6.25 about	Santos*	18.50@19.00
St. Thomas	5.75@6.00	Montevideo	18.00@19.20
Barbados	6.25 about	BuenosAires orLa Plata	18.00@19.20
Kingston	5.50@6.00	Rosario	19.20@21.00
Curacao	[2]6.00 about	West Coast of Italy	28.80 about
Santiago	5.50@6.00	Barcelona***	24.00 about
Guantanamo	5.50@6.00	Chile (good port)	[3]12.00 about
Demerara		Marseilles	27.60 about

* Consignees paying dockage dues. ** Spanish dues for account of cargo.
[2] 700 tons discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port.
W. W. Battie & Co.'s Coal Trade Freight Report.

COASTWISE FREIGHTS

From Hampton Roads to Boston rates are slightly firmer again, charters being made at $1.85@1.90 for medium sized tonnage for a single trip. For the moment quick transportation is scarce but on the other hand the lack of coal at the loading piers is going to make the demand ease off for a week or two. It is still the general expectation that rates will advance in August. Off-shore freights are still so high that it will probably be a long time before American boats now engaged in that trade will be attracted back to the coastwise business.

Barges for Long Island Sound out of New York are still commanding 85@90c.

LAKE MARKETS

PITTSBURGH

Mines operating nearly full, with some labor shortage and fair car supply. Prices unchanged.

The mines in the Pittsburgh district are operating very nearly at capacity, labor supply being somewhat scant. Car supplies are fair but occasionally difficulty is experienced and in some quarters it is thought a serious congestion may occur before the end of the Lake season, as the ore movement is extremely heavy. May broke all monthly records for ore movement down the Lakes and June beat that record by more than a million tons, so that the railroads may have difficulty in moving the tonnage.

There is a fair line demand for coal but certainly no more than would be expected under the circumstances when all stocks were used up at the time of the labor trouble. Shipments against contracts with regular consumers are very heavy. The steel industry is working at its fullest capacity and promises to do so for many months. Lake shipments have increased somewhat.

Quotations for prompt coal are unchanged from a week ago as follows: Slack, 90c.@$1; mine-run, $1.30@1.40; ¾-in., $1.40@1.50; 1¼-in., $1.50@1.60, per net ton at mine, Pittsburgh district. The circular price remains at $1.50 for mine-run.

BUFFALO

Contracts absorb nearly all the bituminous production. Anthracite quiet but not very plentiful. Striking miners returning to work slowly. Car supply running down.

Bituminous—The complaint is that single orders are still hard to get. Contracting has been so heavy that many operators and jobbers find it difficult to get coal enough to fill these. Some of them have given up all effort to sell on single orders and are glad to get coal enough for contracts. It does not appear likely that the miners will return to work in sufficient numbers to produce much of a surplus right away. Wages are high and money is too plentiful with them for any extra exertion.

The bituminous supply here is increased by the offering of a liberal supply of Ohio coal, while at the same time Pittsburgh coal is slowly increasing. Ohio is asking a stiff price, and does not appear so anxious to underbid Pittsburgh as was the case last winter.

Some complaint is heard of car shortage. Gondolas are hard to get and the idea is that cars will be very scarce by fall. If the coal supply does not increase by that time the prices will stiffen. They are fairly strong now, slack being quite scarce. Quotations are as follows:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—There is not much stir in the trade. Shippers are sizing up the situation largely with a view to putting themselves into the best possible shape for shipping and selling coal as soon as the fall demand sets in.

TORONTO

Trade active in all lines. Consumers stocking up in anticipation of shortage. Ample supplies on hand.

The demand for both hard and soft coal is much more active than is usual in the midsummer season. Large consumers are apprehensive of a scarcity and an increase in prices before long and are laying in supplies, keeping the yards busy making deliveries. Dealers have plentiful stocks on hand in all lines and consignments are coming in steadily. There is still a considerable shortage of labor for local deliveries.

Prices are steady, quotations for best grades, per short ton, being as follows: Retail, anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.50; domestic lump, $6; cannel, $8. Wholesale f.o.b. cars at destination, bituminous three-quarter lump, $4; screenings, $3.25; Pennsylvania smokeless lump, $4.50; Pocahontas lump, $5.50; slack, $3.75.

CLEVELAND

Railroad receipts very light. Prices for spot shipments decline. Lake shipments very small.

Receipts of coal for local consumption have been less than any other time this season. Shipments from the mines have been very light and prices locally remain the same as they have been except that small quantities of spot coal for shipment from the mines can be purchased at low prices.

From all appearances the year 1916 will be the largest in the history of the coal business in volume of Lake coal, though during the month of June shipments into Lake Superior were one million tons short of June 1913 which is the record month. The loss of hard coal in that month was 113,000 tons.

Under existing conditions the month of July will see the lowest coal prices that we have had since last fall.

Following are the market prices per short ton f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack		Three-quarter	Mine-run	Slack
No. 8	$2.10	$2.00	$1.90	Youghiogheny	$2.60	$2.50	.....
Cambridge	2.10	2.00	1.85	Pittsburgh	2.60	2.50	.....
Middle Dist.	2.00	1.90	1.80	Pocahontas	....	2.70	.....
Hocking	....	....	1.80	Fairmont	2.10	2.00	$1.90

DETROIT

Steam-coal sales lighter and there is less interest in domestic grades. Lake shippers have difficulty in getting vessels for Lake Michigan.

Bituminous—Several days of high temperature seem to have reduced the industrial demand for steam coal. Buyers are apparently interested only in the fine sizes, prices on which show no material change. The domestic trade is even less active. Neither consumers nor retailers are placing orders freely and are apparently looking for lower prices.

Anthracite—Very little business is being done in anthracite. Stove size is less plentiful than egg or chestnut. Wholesalers are predicting that those now withholding orders may have trouble getting supplies when buying becomes more general.

Lake Trade—With many vessels making the upbound trip without cargo and others loading only for ports on Lake Superior, coal shippers to points on Lake Michigan are offering rates sometimes 100 per cent. greater than last season. Few carriers are obtainable, even to take coal to ports rated as the best on the Lake from an unloading viewpoint. The shipments to Lake Superior docks are not of record dimensions, though well maintained. The statistical report of St. Marys River Canals, shows that there were 264,277 tons of anthracite and 1,791,047 tons of soft coal moved in June. This compares with 300,631 tons of hard coal and 1,624,535 tons of soft coal in June last year and with 414,401 tons of hard coal and 1,846,689 tons of soft coal in June, 1914.

COLUMBUS

Better demand for domestic sizes. Prices are generally well maintained. Future prospects considered bright.

The domestic trade is showing signs of awakening and there is increased activity. Buying is good and the volume of business satisfactory. One of the worst features is the increased shortage of labor, which is curtailing production. There is also quite a pronounced shortage of cars which is hampering the business to a certain extent.

Steam business continues good. Factories in nearly every line of manufacturing, especially those making iron and steel products, are taking a large tonnage. Most of the steam contracts have been closed but there are still a few which are hanging fire. Some buying in the open market is reported.

Retail prices are generally well maintained. Pocahontas is moving well and the same is true of West Virginia grades, such as splints and White and Red Ash. Anthracite is one of the strongest grades in the market with prices ruling firm.

The Lake trade remains active, despite a rather short supply of boats. Word from the upper Lake ports shows that the movement off the docks to the interior is good and no congestion has appeared. Lake prices remain firm in every way. The loading machinery of the Hocking Valley Ry. at Toledo handled 139,000 tons during the past week.

Production in Ohio fields has been curtailed by car and labor shortage. As a result, few of the fields are producing over 75% of normal and some less than that.

Prices on short tons, f.o.b. mines are as follows:

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump	$1.60	$1.70	.....	Egg	$1.30	$1.35	....
Inch and a quarter	1.50	1.50	$1.40	Mine-run	1.20	1.20	$1.15
Three-quarter-inch	1.40	1.40	1.30	Nut, pea and slack	.90	.90	.90
Nut	1.30	1.30	.....	Coarse slack	.80	.80	.80

CINCINNATI

Increasing activity in all departments of the market. The Lake movement heavy.

Indications are that the remainder of the current year is going to see the best business the coal trade has experienced in a long time. Buying is steadily increasing, and the supply

of coal may very well become inadequate before long. The movement to the Lakes is very heavy, all lines shipping to the lower ports being loaded to capacity, and congestion in a good many cases is resulting, although vessels are somewhat more plentiful than seemed probable earlier in the season.

The effect on the local market has been pronounced, especially in view of the fact that many large operators are out of the market, with all of their output contracted for. Cheap spot coal has been virtually eliminated, and buyers are beginning to realize that the time for bargain coal has gone by. Retailers are scrambling for stocks, not only for their winter business but for current demand, as many domestic consumers buy their coal during July and August. Prices are stiffening right along. A limited car supply continues to furnish an additional factor of strength for the market, and bids fair to do so during the entire season.

LOUISVILLE

Steam coals in demand but domestic grades slump. Labor shortage at consignment points. Short-time operations at mines.

What little activity there is, is confined principally to steam coals, which continue in brisk demand. Domestic has gone off generally and is selling slowly. Eastern Kentucky mines for the most part, except where contracts call for steady work, are averaging about three or four days a week. There is no change in the western Kentucky labor situation.

Prices for eastern Kentucky coals, f.o.b. mines, long-ton basis, range around $1.60@1.75 for block; $1.30@1.35 for 2x4-in. egg; $1.05 for mine-run and 65@85c. for nut and slack. Slack in western Kentucky brings about 40c. and nut and slack 65@75c.

COKE

CONNELLSVILLE

Fairly strong market remains for prompt furnace coke. Contract coke dull and foundry slightly easier. Production and shipments increased.

While the extra demand for spot furnace coke on account of the holiday's interruption to shipments is now over, there is still a fairly stiff market, attributed in chief part to difficulty in getting out full production in this hot weather, when the men are indisposed to put forth their best efforts. Occasionally as high as $2.75 is bid for spot furnace coke of the best grade.

There is no further negotiation as to furnace coke contracts and the few consumers who may be uncovered will probably buy from month to month. Some of the furnaces pay a great deal of attention to the byproduct ovens now being completed, as one or two new plants are to come in each month for some time to come and coke is expected to become easier in consequence. While $2.50 is generally asked it is quite possible that $2.35 could be done, as was the case in some contracts already reported.

Foundry coke on contract is a shade easier, there being several sellers at $3.25, when the market was developed at $3.50 when the early contracting was done. We quote: Prompt furnace, $2.50@2.75; contract, $2.35@2.50; prompt foundry, $3.25@3.50; contract foundry, $3.25@3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended July 1 at 423,550 tons, an increase of 6,010 tons, and shipments at 437,016 tons, an increase of 16,307 tons.

Buffalo—The market has stiffened somewhat of late, due to the cutting down of production. In some cases coal has been scarce or in demand for direct shipment. The consumption is good. Some shippers are asking an advance over the regular quotation of $5.10 for 72-hr. foundry, $4.30 for 48-hr. furnace, $3.70 for high sulphur and $3.45 for stock coke.

Chicago—Coke prices have been quoted at an increase of 50c. per ton. A rising tendency is seen in gas house coke. All sizes are selling at a premium owing to production being behind demand, and quotations are as follows per net ton, f.o.b. cars Chicago: Connellsville, $6@6.25; Wise County, $6@6.25; byproduct foundry, $6@6.25; byproduct domestic, $4.95@5.20; gas house, $4.60@4.75.

St. Louis—Domestic coke is showing a little more life. Nearly all the dealers are under contract so there is not much free coke to move here. The Western demand is much better. There is not much new business on foundry coke but shipments going forward on existing contracts are quite heavy. Spot shipments are quoted at $5.25 for foundry, $4.50 for domestic chestnut or stove and $4.75 for domestic egg.

MIDDLE WESTERN

GENERAL REVIEW

Buying improves and prices firm. More domestic coal being stored. Screenings show greater strength.

No great changes have occurred in the Western market during the past week although it is apparent that the industry is entering upon an era of larger activity. Shipments have been increased by the harvesting demands and country retailers are beginning to buy some tonnage for storage. The market is everywhere on an upward turn and but little unsold coal has accumulated at the mines. The car situation has been unsatisfactory in spots, some of the Southern Illinois mines having been handicapped this week by the shortages of equipment.

Steam business shows no easing up, and screenings are firmer and higher by an average of 5c. per ton. The situation continues favorable as to consignment coal; very little stock remains long enough on tracks at distributing centers to influence prices. Anthracite buying is slightly improved, but most dealers are still waiting, and few orders have been given. Transportation is reasonably prompt but it is freely predicted that delays will be experienced when the larger buying begins.

Lake trade conditions remain unchanged with comparatively little coal moving. Railroads are already receiving requests from shippers and buyers for equipment to move tonnage from Eastern mines via the all-rail route. Strenuous conditions are very likely to develop in August unless the supply of Lake bottoms improves. Reports from Duluth docks are to the effect that there is a greater scarcity of coal at the head of the Lakes than ever before with demand from the interior unusually heavy, though it is hoped that with the resumption of operations in the Pittsburgh District that receipts will be larger.

Production at the mines is increasing and most colleries have averaged fully 50% or over during the past week.

ST. LOUIS

Market steady but quiet since the holiday. Less railroad buying.. Screenings show no indications of weakening.

In the Standard district most of the mines have lost three days' time in the last week but domestic business has begun to pick up again noticeably. There is a little less railroad business as the Wabash, which was buying Standard coal on the open market, has contracted for its supply effective July 1, from the mines on its line in the Springfield and Staunton districts. Standard screenings continue in stiff demand at top prices. Indications are that there will be no break in screenings this month and that even later the price reduction will not be anything like as great as usual.

Things are beginning to move down in Franklin County. Domestic business is beginning to come in at a good rate and the demand for steam sizes is outrunning the supply right along.

Williamson County coal is beginning to move locally to the dealers. There is considerable out of town demand well scattered.

Anthracite is dull. The raise in freight rates last July and the increase in price this April seems to have taken all the enthusiasm out of the dealers. The price was so high that they are mostly only handling it under protest and pushing substitutes in the shape of high-grade soft coal and coke at every chance.

The market is quotable on the following basis per net ton, f.o.b. mines:

	Franklin County	Williamson	Staunton and Montgomery	Intermediate	Standard
6-in. lump	$1.65	$1.35@1.55	$1.25	$1.25	$1.00
6x3-in. egg	1.65	1.35@1.55	1.25	1.25	.95
3x2-in. nut	1.65	1.35@1.55	1.25	1.25	.90
No. 2 nut	1.50	1.15	1.10	1.00	.90
No. 3 nut	1.35	.....	.....	.....	.....
No. 4 nut	1.35	.....	.....	.....	.....
No. 5 nut	.75	.....	.....	.....	.....
Screenings	.95	.90	.90	.85	.85
2-in. lump	.....	.....	1.15	1.00	.85
Steam egg	.....	.....	1.15	.....	.85
Mine-run	1.25	1.15	1.10	1.00	.85
Washed	.....	.....	.....	.....	.....
No. 1 nut	.....	1.65	1.50	1.40	1.40
No. 2 nut	.....	1.50	1.30	1.25	1.25
No. 3 nut	.....	1.35	1.30	1.25	1.20
No. 4 pea	.....	1.35	1.25	1.25	1.20
No. 5 slack	.....	.75	.70	.70	.70

CHICAGO

Steam coal orders strong. Better tone in domestic sizes. Screenings higher.

Harvest demand from Southern Illinois mines has been the prominent feature of the week and at some mines sufficient

cars were not available. Increased ordering of domestic sizes has been noticeable. Screenings have been averaging from 95c. to $1. No unsold coal has accumulated and prices on domestic sizes have been running strong reaching as high as $1.65.

In the Springfield district an improved tone is noted. Domestic orders have commenced to come in and screenings have been in stronger demand at higher prices.

The Indiana operators report a better run of business at this time of the year than ever experienced before with prices well maintained. Domestic orders for No. 4 coal are in goodly volume, some operators receiving as high as $1.60. Steam coal has been shipped principally from Knox County. Demand for steam sizes from Indiana industrial centers shows no abatement.

The smokeless market shows firmer tendencies and it is felt that by the end of July buying will be on a much stronger basis. On July first the price of lump and egg advanced to $2 per ton at which the important shippers are holding firm.

Hocking operators seem to have been successful in creating a broader interest for their coals in this territory. Harvest demands have been strong and the shortages of Lake boats and railroad equipment have increased the all-rail movement. But little activity is noted in splint coals. Eastern Kentucky grades have shown little life and prices are still wide apart.

Inability of anthracite agencies here to obtain sufficient tonnage via the Lakes is causing some concern and unless the boat situation improves, a stringency will occur when the demand becomes more pressing. Buying of anthracite is still below normal and if this territory should become dependent mainly on rail movement during the fall or winter, dealers are likely to experience delays and perhaps will find prices unduly high when they decide to place orders. Some difficulty is being experienced at the present time in securing stove for prompt delivery.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin Co.	Springfield	Carterville	Clinton	Knox and Greene Cos.
Lump	$1.55@1.65	$1.50	$1.50@1.60	$1.50	$1.50
Steam lump	1.35	1.30@1.35	1.40@1.50	1.35@1.45	1.35@1.45
2½ and 3-in. lump	....	....	....	....	1.45
1¼-in. lump	....	....	1.30@1.35	....	....
Egg	1.55@1.65	1.20@1.25	1.25@1.30	1.50	1.50
Nut	....	1.20@1.25	1.20@1.25	1.35@1.50	1.25@1.35
No. 1 washed	1.65	....	....	....	....
No. 2 washed	1.50	....	....	....	....
No. 1 nut	1.50@1.55	....	....	....	....
No. 2 nut	1.45	....	....	....	....
Mine-run	1 25	1.15@1.25	1.10@1.15	1.10@1.15	1.15
Screenings	.95@1.00	.90@ .95	.90@1.00	.95@1.00	.95@1.00

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.55@1 65	$1.60@1.85	$1.60@2.00	$1.60@1.80	$1.65@1.75
1¼-in. lump	1.30@1.35	....	....	....	1.60
Egg	1.55@1.65	1.25@1.60	1 60@1.90	1.60@1.75	1.60@1.65
Nut	1.50@1.55	1.15@1.35	1.45	....	....
No. 1 nut	1.50@1.55	....	....	....	....
No. 2 nut	1.45	....	....	....	....
Mine-run	1.25	1.15@1.25	1.25@1.35	1.25@1.35	1.25
Screenings	.95@1 00	.95	....	....	....

KANSAS CITY

Domestic coal is in liberal supply while steam coal is easy, and less is being stored than last week. Mines are operating more smoothly than for many months. The demand for threshing is unusually large, owing to the rapidity with which threshing is proceeding, and the unexpectedly good crops of wheat in some districts.

I. C. C. DECISIONS

No. 6492—Brush Creek Mining and Manufacturing Co. vs. Louisville & Nashville R.R. Co. Submitted May 8, 1914. Decided May 23, 1916.

1. Carload rates of the Cumberland R.R. and the Louisville & Nashville R.R. on coal from mines on the Cumberland R.R. to the northwest and the southeast found not to be discriminatory because they exceed group rates of the Louisville & Nashville R.R. to and from the same territories from and to mines on that road, but found to be unreasonable to the extent that they exceed such group rates by more than 5c. per ton, and the defendants required to publish rates on that basis. Reparation denied.

2. Rates on inbound supplies to mines on the Cumberland R.R. not found to be unreasonable or discriminatory.

No. 7587—Colorado Fuel Co. vs. Missouri, Kansas & Texas Ry. Co. of Texas. Submitted Oct. 31, 1915. Decided May 19, 1916.

Reconsigning and back-haul charges assessed on a carload shipment of coal from Hickory Canon, Colo., to Gould, Okla., found unlawful. Reparation awarded.

PRODUCTION AND TRANSPORTATION STATISTICS

MIDDLE WESTERN ROADS

The following is a comparative statement of coal handled by the 17 principal Middle Western carriers for the months of March, and the first three months of 1915 and 1916:

	March 1915	March 1916	Three Months 1915	Three Months 1916
Illinois Central R.R.	651,454	828,210	2,060,078	2,969,706
C. & E. I. R.R.	530,338	770,161	1,770,991	2,589,889
C. B. & Q. R.R.	408,677	480,467	1,538,959	2,021,183
C. C. C. & St. L. R.R.	439,458	566,946	1,397,736	1,830,067
Vandalia R.R.	426,860	542,171	1,353,083	1,684,834
C. T. H. & S. E. Ry.	277,246	413,476	872,546	1,224,257
C. & A. Ry.	160,556	217,435	520,967	852,343
Wabash R.R.	148,585	160,484	466,295	586,388
St. L. I. M. & S. Ry.	126,732	125,160	389,524	454,050
Southern Ry.	97,474	209,963	291,637	589,435
B. O. S. & W. R.R.	99,421	60,351	307,430	229,873
St. L. R. & E. R.R.	63,360	63,854	175,730	240,840
St. L. & O. F. Ry.	56,440	62,780	177,196	222,645
L. & M. Ry.	58,118	53,221	179,044	175,652
C. I. & L. Ry.	58,825	83,186	145,450	218,769
C. P. & St. L. Ry.	38,798	50,691	123,936	176,866
C. & N. W. Ry.	34,425	47,106	119,151	198,073

COAL MOVEMENT

Fuel shipments over 13 of the leading Eastern carriers for March and three months of 1915 and 1916 were as follows, in short tons:

Anthracite	March 1915	March 1916	3 Months 1915	3 Months 1916
B. & O.	88,592	190,276	339,093	444,758
B. R. & P.	11,612	14,633	38,303	49,899
B. & Susq.	248	664	1,667	2,287
C. & O.	441	779	2,242	3,038
Erie	672,548	901,696	2,078,807	2,637,488
H., B. T. M.	1	.....	63	97
Penn.	814,872	1,120,060	2,472,278	3,228,518
P. S. & N.	688	1,338	3,265	4,297
Virginian	13	269	111	587
W. Md.	19,590	35,015	67,697	98,631
Total	1,608,605	2,264,730	5,003,526	6,469,600
Bituminous				
B. & O.	2,238,382	2,940,665	7,500,603	7,832,774
B., R. & P.	594,225	836,885	1,677,036	2,567,899
B. & Susq.	69,507	113,511	246,159	409,446
C. & O.	1,435,797	2,298,216	4,514,474	6,548,497
Erie	457,492	889,331	1,553,608	2,577,912
H., B. T. M.	78,709	98,818	236,380	317,703
N. Y. C.[1]	528,759	797,093	1,496,233	2,319,611
N. & W.	1,673,690	2,403,877	4,695,471	7,070,107
Penn.	3,243,270	4,203,171	9,771,261	12,719,170
P. S. & N.	159,692	238,575	570,968	657,359
Virginian	289,103	498,189	879,047	1,431,795
W. Md.	677,196	625,168	1,879,123	1,937,454
Total	11,445,822	15,943,499	35,020,363	46,389,727

[1] Buffalo and east.

LAKE SHIPMENTS

Shipments of coal through the Sault Ste. Marie Canal for June amounted to 2,055,424 tons of which 1,791,047 tons was bituminous and 264,377 tons anthracite. The shipments for May amounted to 2,326,933 tons.

FOREIGN MARKETS

GREAT BRITAIN

June 28—Steam-coal market conditions are quiet, but the general tendency is firm. Tonnage is arriving more readily and with considerable government business still on hand, practically all the colliery owners are fully booked for the present. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$11.76@12.00
Best seconds	Nominal	Seconds	11.04@11.52
Seconds	$11.76@12.00	Best Cardiff smalls	6.96@ 7.20
Best dry coals	9.60@12.00	Cargo smalls	4.80@ 6.00

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Outward chartering is much below the average. Rates are approximately as follows:

Gibraltar	18 40	Naples	$19.20	St. Vincent	$10.80
Marseille	16.80	Alexandria	22.80	River Plate	11.40
Algiers	..	Port Said	22.20		
Genoa	19.20	Las Palmas	10.20		

On the Pacific Coast coal from China and Japan is used almost exclusively in the bunkering trade, though it was a factor in the retail market in former years when there was a shortage of household coal.